AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry

VOL. 122 No. 16
WHOLE NO. 2046
NEW YORK, FRIDAY, OCT. 16, 1925, ATLANTIC CITY, N. J.
Subscription, $3 Per Year
$4 Canada $5 Foreign

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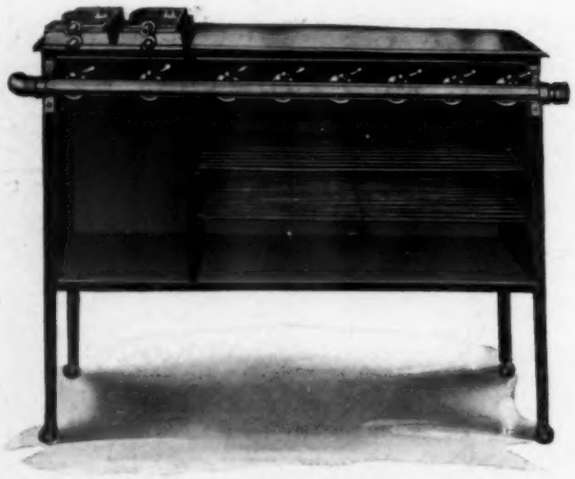

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AMERICAN GAS JOURNAL, Oct. 16, 1925. Vol. 123, No. 19. Published weekly by American Gas Light Journal, Inc., New York, N. Y.
Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

American
GAS JOURNAL

Vol. 123 No. 19 NEW YORK—OCTOBER 16, 1925—ATLANTIC CITY, N. J. Whole No. 3545

Gas Rates And Finance

Gas Men Listen To Papers On Important Policies Mail Vote On 1926 Convention Location

Rate structure policies, employe education, and financing from the standpoint of customer and employe ownership occupied places of equal importance in the addresses presented at the third and concluding general session of the American Gas Association's convention held Thursday morning in Convention Hall at the Steel Pier. The report of the Time and Place Committee occupied the final minutes of the meeting, following which former president, George B. Cortelyou, formally closed the meeting with a brief but stirring appeal for greater humanization of the industry. "Let us," he said, "by our energy, ambition and devotion make every man know the great future of the gas industry."

RATE STRUCTURE

The subject of rate structure and its importance to the future growth of the industry was the keynote of three addresses presented in turn by Ewald Haase, Chairman of the Rate Structure Committee, Milwaukee, Wis.; H. M. Brundage, Chairman of the Rate Fundamentals Committee, New York, N. Y., and T. V. Purcell, vice-president of The Peoples Gas, Light & Coke Co., Chicago, Ill.

"Selling A Proper Rate Structure" was the title of the talk given by Mr. Haase. The speaker reviewed the difficulties of the subject, particularly as related to the elements of cost underlying the service of the gas utility. Proper and adequate rate structure today is a serious problem, it was said, as evidenced by the fact that there are many companies urging a change in their rate structure which will enable them to sell gas in volume and of such load factor as to make their plant investment pay better and be of greater usefulness to the community served, and enable them to supply new uses at a cost which such users can bear.

RATES IN ALABAMA

In speaking of the changes which have been made in rate structure from time to time, Mr. Haase gave the State of Alabama credit for the most progressive effort along these lines. In this connection, he quoted in part from the report of the Alabama Public Service Commission as follows:

"The old form of straight meter rate apparently had the effect of penalizing the customer for an increased use of gas rather than encouraging him by a low consumption charge to become a better customer of the utility and both benefit thereby.

"Under the present rate (two-part rate) not only the total consumption per customer, but also the average revenue per meter appears to be increasing. A study of the costs of rendering gas service to various classes of customers in Montgomery (Alabama), convinces the commission that under the old form of rate many smaller customers were actually served at a loss, which loss was made up by some other customers, or class of customers, making greater use of the service. This inequity in the Montgomery case was so marked that the commission feels that a great injustice would be done to all parties concerned should a return to the old form of rate be made."

RESULTS MOST SATISFACTORY

The testimony of W. R. Waggoner, Commercial Department, Alabama Power Co., Montgomery, Alabama, was quoted in part as follows: "The effect of the two-part rate in Montgomery has more than exceeded our expectations. After two years' operation under this rate, which is one of the few two-dollar service charges in use, we have practically no complaint and our sales per customer and revenue per customer have materially increased. Our output increased to such an extent that we found it necessary to increase our plant facilities last fall. From a steady downward trend our output and revenue curves are now both upward."

In the concluding moments of his talk, Mr. Haase called attention to some of the more important work performed by the different sections and committees along this line. "Nothing," he said, "in what has been referred to above is so encouraging as is the fact that so many men in the industry have become interested in and are engaged in an intense study of rate structure. We call attention to the

work done in the Accounting Section, by the Committee on Analysis of Gas Company Statistics, who have studied costs and the factors on which cost depends and by which they are controlled. The Distribution Committee, Technical Section, through the appointment of the Sub-Committee on Definition of Terms is gathering together all data as to load factor, diversity factor and demand with the view to finally determining definite and comparable definition of terms and having them made standard as far as possible."

MR. BRUNDAGE ADDRESSES MEETING

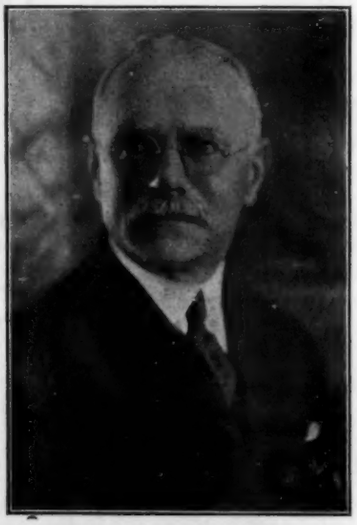
In his address entitled "Status of Rate Making and a Study of Some Neglected Factors," Mr. Brundage gave the greater share of attention to past and recent decisions of the state and Federal governments as effecting rate structure policies pursued by different public utility companies. In this connection he pointed to a recent decision of the United States Appelate Court wherein it was given as the opinion of the court that rate levels based on a ten-year average of costs were inaccurate. The reason for this, it was stated, was due to the wide differentation between war and post-war price factors. In citing this instance, Mr. Brundage pointed to the importance of managing executives keeping in close touch with all court decisions affecting rate structure. As a concluding remark, the speaker strongly urged upon his hearers the advantages of adopting the three-part rate in the gas industry.

LOWER COMPETITIVE RATES

Lower competitive rates for gas, the adoption of a more scientific rate structure by gas companies to increase their individual load and, eventually, to offer the domestic customer the benefits accruing from increased business, were the outstanding policies advocated by Theodore V. Purcell, vice-president of the Peoples Gas, Light & Coke Co. of Chicago in his address entitled: "Rates for Industrial Gas."

"If industrial customers can be induced to use gas for heating on a large scale without increasing the burden now borne by small customers," Mr. Purcell said, "the industry will prosper, profits will increase and the small customer will ultimately profit. If not, the small customer must continue permanently to carry all charges.

"It is evident that in some of the items of cost a distinction



WILLIAM BAURHYTE
Pres. Los Angeles Gas & Elec. Co.
Los Angeles, California

should be observed between domestic customers who can demand service and who, therefore, require the maintenance of sufficient plant and equipment to meet their largest peak load, and other customers who will purchase gas only

(*Continued on page* 439)

CLARE N. STANNARD
Vice-Pres. & Gen. Mgr.
Public Service Co. of Colorado
Denver, Col.

Home Service Means Home Building

Important Phase of Gas Discussed at Public Relations Symposium

Soul, conscience, heart, home, these may sound unusual as being part of the transactions of the convention of a great industry such as is centered in the American Gas Association. Yet these were keynotes of the talks Wednesday night at the Public Relations Symposium in the auditorium on the Steel Pier.

General Harvey H. Hannah, chairman of the Tennessee Railroad and Public Utilities Commission, who left a convention at the Nation's Capital only eight hours before, was the first of two speakers to address the gathering presided over by President H. C. Abell. Mrs. Anna J. Peterson, director of the Home Service Department of the People's Gas Light & Coke Company, Chicago, closed the program.

GENERAL HANNAH ADDRESSES MEETING

In introducing General Hannah, President Abell told how the speaker had turned over a nominating speech he was to have made in Washington at the convention of the Public Service Commissioners to someone else, and hurried to the gas convention. Following his talk he was to go by bus to Philadelphia, there to

catch the night train for his return to Washington.

General Hannah's subject was "Good Public Relations—A Commissioner's Viewpoint." Mrs. Peterson, in her talk, spoke on "Our Greatest Market — The Home."

The commissioner started his talk by bringing felicitations from his convention to this, and told with what approbation the Public Utility Commissioners of forty-eight states had noted the promotion of favorable relations with the American people on the part of the gas industry.

UTILITIES' DEVELOPMENT TRACED

Then, in allegory and homely tale, he traced the development of the great utilities, going far back to the original dreamer whose brain has brought forth the idea of a wheel, another wheel, and an axle between them, to take from man the heavy burden which had been on his back from the days when the original man had been driven forth from the Garden of Eden.

Thence through the ages he brought his hearers to the time when another dreamer had made fuel, coal, wood, gas, turn the wheel—the same wheel—and now take the burden from the back of woman. In full sounding oratory he sang the praises of the man who had invented one after another of the burden lifters that today have made the work of woman in the home no work at all, but the most pleasant sort of play.

Credit for these modern improprovements he gave entirely to the foresight, the perseverance, the public spirit of the great utilities which nowhere so much as in America have brought forth one after another of effort saving appliances.

He recalled that when a young man in the law school he had studied about the corporation, a relatively recent invention of man, and perhaps one of the greatest. He had learned that the corporation was a legal being, a living entity before the law, with power to sue and be sued, but with neither heart, nor soul, nor conscience. Be believed this for many years, but more recently has had reason to change his original conception of a corporation.

CORPORATIONS HAVE HEART AND SOUL

For, he went on, his contact with the great utilities has taught him that the great corporations which operate them have heart, and soul, and conscience, that they are ever trying their utmost to be friends of man, to aid man and to give to man all the pleasures that life can have.

Referring to his native Tennessee, he told how his grandsire taking him along the river of the valley of Eastern Tennessee had told him of the great and powerful fairies of the valley that some day would unlock their store of power, that would make the life

MRS. ANNA J. PETERSON
Peoples Gas Light & Coke Co.
Chicago, Ill.

of every man and woman living in the state much the better for their being.

"You have given woman a stove with a clock on it," he said. "Now she can put on the dinner, and go out to the movies in giving which you have also had your part, confident that at the proper time, the heat will be turned off, the dinner will remain fresh, and she can go back to her home and greet her husband on his return from work, with a splendid meal, and fresh as if she had had nothing whatever to do with its preparation, thus creating anew that happiness of home than which there is no greater blessing."

MRS. PETERSON TELLS OF HOME AID

The gas company as a home builder was Mrs. Peterson's theme, and she told how, repeatedly she had heard the story of the deserted dinner table and had given the remedial measures which had served to rebuild the broken down happiness that the swift moving life of this hectic day had somehow wrecked.

"Certain changes have taken place in the home which we must recognize," she said. "Mothers, in olden times, were subservient to the lord and master of the home, called the father. While man reigned supreme very little development took place to lighten the burden of household duties. The father expected to be waited upon by mother and children. His comfort came first. His every word was law. He never knew the mother's problem. He wasn't interested in it, or anything other than obedience by every member of the family.

"The same irksome demand for unreasoning obedience in every detail of life, even to the thought and worship of Almighty God, led him to gather his family and friends and leave the old world for the new.

"The same spirit which brought the pilgrims to America led them finally to unite as colonies and declare themselves free forever from a tyrannical king who exacted nothing but obedience, listening not to the voice of reason or right.

HER KINGDOM "THE HOME"

"If the fathers but knew it, this was the second big lesson they had given the American mother in asserting her rights of partnership—equal voice in her kingdom, 'The Home.'

They didn't see it then. We women have a way of patiently biding our time, and just going on for a hundred years or more, making changes so gradually and so surely that the average man wakes suddenly to a world en-

tirely different, and utterly aghast he exclaims, 'What have we here?.

"He had not awakened until this great change—of the equality of woman—was in the home to stay. To wield and cement it firmly, the great war came and this same home woman went out into his world and once more proved she was his partner in reality, a comrade in every sense of the word. Necessity and the shortage of men brought the woman out of the home into paid positions in factories and offices. She rendered a needed service at the time and kept house besides, and she got into bad food habits.

BAD FOOD HABITS

"She either went to the restaurant or ran into the delicatessen, buying food poorly selected and not economical, or she bought the expensive cuts of meat which contained little nourishment, and in her hurried way, she did two things. First, she lost the beauty and loveliness of life through overtaxed nerves, and second, she did not feed her family well, overlooking the great needs of growing children. Neither did she train those children well, for she was not at home to do it, when they came home from school. She actually got the idea that the salaried job was a bigger thing more worthy of her time and effort than keeping house, cooking three meals a day and molding the character of children into the channels of fine manhood and womanhood.

"This is one of the biggest things we do in home service. We show a woman who feels this restless urge, to work out of the home, that home work pays big dividends. We actually show her in figures what she can earn by her efforts in the different branches of the home. We have found that home cooking—the mixing of wholesome food, gas heat, and brains, into a delicious satisfying meal which nourishes and sustains, bringing health and success to every member of the family—we have found that home cooking is the most lucrative field for woman's effort in the big home partnership. If she actually paid herself in dollars and cents what she saved her family in restaurant prices and doctor bills, she would be a high-salaried woman.

OTHER FIELDS FOR WOMEN

"The war called many women

(*Continued on page* 440)

Industrial Rates Must Be Competitive

Insulation, Control and Data Sheets Discussed

On Thursday afternoon in the Music Room of the Chalfonte the third session of the Industrial Section of the American Gas Association was held, the chairman, H. O. Loebell, presiding.

The report of the Research Committee came first, read by its chairman, Mr. J. B. Allington, of Rochester Gas & Electric Corporation, Rochester, N. Y.

After reviewing the work of that committee it was recommended that the laboratory at Cleveland be equipped to test industrial appliances as well as domestic, and that the research service be broadened and extended.

INDUSTRIAL GAS RATES

An address on "Rates for Industrial Gas" was delivered by T. V. Purcell, vice-president of the People's Gas Light & Coke Co., of Chicago. Mr. Purcell, after emphasizing two points, viz., that sales were made up of diverse customers each with a characteristic load and that the business was competitive or non-competitive went on as follows:

"The problem may be stated as follows: A certain investment in plant and equipment is actually needed to carry on the principal function of the public utility, that is, supplying gas to a large number of domestic customers. This equipment is necessarily large in relation to its actual total use on account of the peak demands of these customers resulting in a part of the capacity remaining idle except for the cmparatively shore peak period.

(J. J.) **Quinn of Quincy** (Mass.)

Now by utilizing this idle capacity, a large volume of business of divers echaracter can be taken on. The question then is: Shall the new business be charged for its pro-rata share of the total plant and equipment or only for the additional capacity required?

Income from Competitive Business Must Be in Excess of Operating Costs and Fixed Charges on Additional Investment Required

"It is obvious that the new business cannot tend to lower the price to regular customers unless it pays full operating costs and a share of the capital charges that will more than fully cover all the additional investment required.

"Therefore, when we proceed to assign the investment to the several classes of sales the highly

competitive nature of the industrial business must be recognized. These are not customers who demand gas service. They can and do use other fuels with equal willingness and can be induced to use gas only by correct pricing and good salesmanship. If they can be so induced without increasing the burden now borne by small customers, the industry will prosper, profits will increase and the small customer will ultimately benefit. If not, the small customer must continue permanently to carry all charges.

"As to the above described industrial customers, it is believed that only the additional investment actually made to take on the business should be assigned to this class.

A NEW INDUSTRIAL RATE

"In the study recently made for a new rate for The Peoples Gas Light and Coke Company the sales were analyzed into classes and particular attention was given to the load factors, diversity, and other features of the domestic and industrial loads. It was observed:

"That the production load factors of the two loads were about equal.

"That the distribution load factor of the industrial load was higher than that of the domestic load.

"That the industrial business was competitive.

Factors Considered before Assigning Investment

"Before considering the effect of the diversity between the two classes and having in mind only the load factors it would seem that the investment should be assigned on a pro-rata basis, but, as will be shown later, the diversity in this case is of such a character that taking into consideration the fact that the business is competitive it is proper to assign only a small part of the distribution investment to the industrial class.

Manufacturing Fixed Charges

"Proceeding to a consideration of the cost items entering into a rate for industrial gas the first item of cost is that of the fixed capital charges incurred in owning and holding ready the necessary plant for the production of gas.

"For the situation under consideration the present cost of constructing the generators, boilers, holder, and other equipment for producing carburetted water gas is approximately $250,000 per 1,000,000 cubic feet of capacity per twenty-four hours.

Recapitulation

"To recapitulate, the cost to this company of selling additional gas for industrial uses would be as follows, per 1,000 cubic feet of gas sold:

	Per 1,000 Cubic Feet
Production and holder fixed charges based on an investment of $250,000 per $1,000,000 cubic feet of capacity and 300 days average use at 12% per annum	$.1000
Fixed charges on mains, services, and meters necessary for this supply	.0039
Cost of producing gas as previously shown	.3430
Cost of pumping gas	.0127
Gas lost in condensation and leakage	.0140
Cost of meter reading, bookkeeping, etc.	.0004
Total Cost	$.4740

The New Rate

"Upon the basis of an average cost of $.4740 per 1,000 cubic feet of gas sold, a new rate was prepared as shown below:

Demand Charge

"5c per cu. ft. for the first 100 cu. ft. of the maximum hourly demand.

"4c per cu. ft. for the next 400 cu. ft. of the maximum hourly demand.

3c per cu. ft. for the excess over 500 cu. ft. of the maximum hourly demand.

Output Charge

"70c per 1,000 cu. ft. for the first 100,000 cu. ft.

"60c per 1,000 cu. ft. for the next 400,000 cu. ft.

55c per 1,000 cu. ft. for the next 500,000 cu. ft.

50c per 1,000 cu. ft. for the next 1,000,000 cu. ft.

45c per 1,000 cu. ft. for the excess over 2,000,000 cu. ft."

A general discussion followed this very able paper.

PRESIDENT ABELL ADDRESSES MEETING

The business of the meeting was suspended at this point while the gas men listened to a few remarks by A. C. Abell, President of the A. G. A., who suggested that in future an attempt be made to have

(*Continued on page* 446)

Taking The Public Into Confidence

Publicity Men Re-elect Chairman F. L. Blanchard

Chairman F. L. Blanchard, of the Publicity and Advertising Section of the A. G. A., was re-elected at the second meeting of the section yesterday afternoon at the Hotel Traymore. The election preceded the second part of the First National Conference on Information Committee Work, under the auspices of the section, and called by President H. C. Abell, of the A. G. A.

How fully the public should be taken into the confidence of the utility formed the keynote of most of the talks of the afternoon. The function of welding together in common bonds of interest the various utilities of the state for the fuller expression of their good will to the public, their better relations with the public and their better inter-relation were also dwelt on at length.

WHAT THE PUBLIC SHOULD KNOW

"What the Public Ought to Know" was the title of the address by Charles A. Munroe, chairman of the Board of the Laclede Gas Light Company of St. Louis, Mo. Mr. Munroe had the highest praise for the State In-

formation Committees and told of his contacts with some of them.

The change in conditions which had brought public utility securities from the greatest disfavor among banks, bankers and investing public shortly before the war up to the present time when "all the financial papers and most of the bankers and investment houses are recommending as a sound investment, public utility securities," Mr. Monroe declared, "had been hastened and made general by the work of the information committees." If this job, which was well done by these committees," he pointed out, "was the only thing they ever did, they have more than justified their existence."

P. H. GADSDEN
Vice-Pres. The United Gas Improvement Company of Philadelphia

That the welfare of the community is linked with the prosperity and efficiency of the utility, is a belief of which has been established chiefly by the work of the committees. "This," said Mr. Monroe, "is the other notable achievement to which I referred."

CUSTOMER OWNERSHIP

"The creation of a body of more than 2,500,000 customer-owners of public utilities," Mr. Monroe pointed out, "was also of tremendous value to the companies." "The confidence which had been built up to make these customer-owners," he felt, "was due in large measure to the work of the committees."

The honesty of the public utilities, the responsibility which the company officials feel to the public are yet to be fully driven home according to Mr. Monroe, and here is further work for the committees.

The importance and stability of the gas industry must be driven home to the public, and the committees can also be of great assistance in enabling the companies to secure an adequate service charge.

Going on to present ways in which the committees could be of further service to the companies, Mr. Monroe said:

COMMITTEES CAN ASSIST INDUSTRY

"The committees can assist the entire industry in securing an amendment to the public utility laws so as to enable companies to operate under the indeterminate permit. Since the days of regulation it is no longer necessary for a community to wait until the expiration of the franchise before it can get the utility to correct its rates and service. At all times matters of this kind can be taken up and promptly disposed of."

"The executive of a public utility has no more important task to perform than to give to the work of the Committee on Public Utility Information in his state, the time and though necessary to enable that committee to disseminate this information so vital to our business, and to do it so effectively and well that the public will fully understand it," Mr. Monroe concluded.

That it was just as important to interpret the public to the utilities, as vice versa, was a striking point made by F. W. Crone, director of the New York Committee.

OPEN HOME WEEK

The organization of "Michigan's Second Open House Week" was discussed by Alfred Fischer, director of the Michigan Committee. This had begun with an executives' meeting six months before the meeting was scheduled, had been followed with the preparation of the companies for their effort, the appointment of local directors of effort who went about preparing the material which was to go to the public, and then of the start of the actual open house week.

By articles in the paper throughout the state, the public interest was concentrated on the local utilities. Then the plant guides, in a final dress rehearsal took the office force through the plant and vice versa, the day was set and Open House Weeks were held throughout the state.

Then the man who had been put in charge had a chance to see how good had been his work. For it had been his last task to go out and drum up attendance for the coming Open House Week. The event took place in the six days preceding this convention, and the results are not yet tabulated. It was already evident, however, according to Mr. Fischer, that the attendance throughout the state had been about 35,000, as compared with the 16,000 at the first Open House Week.

P. H. GADSEN TALKS ON COMMITTEE WORK

Philip H. Gadsden, vice-president of the United Gas Improvement Company of Philadelphia, and chairman of the Pennsylvania Committee, told of their work. How, shortly after the beginning of operation of the information committee, a committee of the executives of the various utilities had been formed and how they had come to plan their year so that similar work could be done at the same time, so that the combined thought of their several brains could be applied to the problems, common to all, which came up during the year, and how finally, these executives had suddenly made a discovery, as a result of which a Technical Committee, composed of engineers of the various utilities, and of the Philadelphia city departments had been formed, with a

resultant saving to both city and utilities, by contemporaneous substreet level work, and the like.

Mr. Gadsen found to recommend this meeting of executives, community of relations, interchange of ideas, the meeting of common problems, and the promotion of better public relations for one and all.

CONTACT WITH COMMERCIAL ORGANIZATION

"Contact with Commercial Organizations" formed the meat of John Mellett's address to the conference. Mr. Mellett is director of the Indiana Committee. He dwelft on how his committee had, and other committees could, co-operate with chambers of commerce throughout the state and with commercial secretaries throughout the state. He detailed how information he had been able to place in the hands of the State Chamber of Commerce had been instrumental in getting a bill passed before the legislature for the improvement of traffic in the cities by regulation of bus franchises and traffic.

"There is no limitation on the work the Information Committee can do in the promotion of more favorable relations between the public and the utilities," Earl W. Hodges, until three weeks ago director of the Arkansas Committee, declared.

CLOSER CONTACT ADVOCATED

Mr. Hodges told of how the information committee had done every sort of work to develop closer contacts between utilities of all sorts, including the major railroad trunk lines passing through the state, and the public. At county fairs and state fairs, before civic and service clubs, in the schools and before the women's clubs, the case of the utilities had been put forward.

In the legislature, in three years, the life of the Information Committee in his state, the number of anti-utility bills which had come before the legislature had been cut from 120 to none at all. George E. Lewis, director of the Rocky Mountain Committee, told of work done in his district.

As the meeting closed there were expressions on all sides of the benefit that had come from this first National Conference, both in bringing the executives and state directors of information committees together, and in allowing the exchange of ideas between the various directors.

Technical Men Hold Final Session

Water Gas and Chemical Problems Are Discussed

The first paper on the program at the meeting of the Technical Section, held yesterday afternoon on the Steel Pier, was on "Problems Confronting the Chemist in the Gas Industry," by A. F. Kunberger, Chief Chemist, the U. G. I. Contracting Co., Philadelphia, Pa. In this paper there was contained a detailed discussion of the most important chemical problems that are confronting the technical man in the gas industry.

Mr. Kunberger emphasized the importance of chemistry in the gas industry and discussed such problems as the removal of impurities from the gas. Special attention was given to the subjects, total gasification and low temperature carbonization. In talking about low temperature carbonization he mentioned the fact that the greatest drawback to the process was the quality of the coke that is obtained with it and the life of the apparatus. He said: "However, late developments indicate that both may be neglected, as an apparatus has been developed that is supposed to give a very hard coke and the modern construction is expected to assure a reasonable long life for the apparatus."

WATER GAS

At the conclusion of Mr. Kunberger's paper the meeting had the pleasure of listening to the report of the Water Gas Committee through its Chairman, J. H. Warnick, Engineer of Manufacture, Equitable Gas Co., Pittsburgh, Pa. The report was divided into three parts, one concerns with operations, the second concerned with uncarburetted water gas and the third with the builders.

Francis E. Drake, Manager of the Gas Department, Lynn Gas & Electric Co., Lynn, Mass., Chairman of the sub-committee on Operators' Section, delivered the report of that division of the Water Gas Committee. He stated that the outstanding development reported in paper on soft coal operation is the so-called "Pier Process." In the article on the use of oxygen in the manufacture of water gas a description is given of the Jeffries-Norton process. Another interesting report was made under the section of refractories. Waste heat and oil efficiencies were also subjects for discussion.

SOFT COAL AS WATER GAS FUEL

This subject was discussed fully in the meeting. The main paper on this interesting subject was read by W. G. Rudd, Chief Operating Engineer, The Peoples Gas, Light & Coke Co., Chicago, Ill., on the use of bituminous coal as a generator fuel. Results obtained at various plants were described in detail. Under the title of Use of Illinois Coal with the Pier Process, M. P. Novak, of Coal Products Manufacturing Co., Joliet, Ill., discussed the results obtained in this process.

Other reports that were made included the following: Gas Analyses with Mixtures of Soft Coal and Coke in Water Gas, L. J. Willien, Chemical Engineer, Charles H. Tenney & Co., Boston, Mass.; report of the sub-committee on the Back Run Process, A. H. Anderson, Chairman, Detroit City Gas Co., Detroit, Mich.; report of the sub-committee on Modification of Water Gas Sets for the Use of Heavy Oil, W. D. Stewart, Chairman, Western United Gas & Elec-

tric Co., Aurora, Ill., and report of the sub-committee on Use of Oxygen in Water Gas Machines, A. C. Frey, Chairman, Worcester Gas Light Co., Worcester, Mass.

REFRACTORIES

The report of the sub-committee on refractories was presented through the Chairman, Walter M. Russell, Massachusetts Lighting Companies, Voston, Mass. The report discussed the use of Bernitz blacks and the conclusions stated that their use would increase the capacity of any machine, improve fuel and oil results, eliminate clinker adhesion to the walls of the generator, etc.

Reports were also made by other sub-committees as follows: Use and Development of Exhaust Steam Regenerators, R. E. Kruger, Chairman, Rochester Gas and Electric Corporation, Rochester, N. Y.; Oil Gas Machines, Robert Lindsay, Chairman, New Bedford Gas & Edison Light Col., New Bedford, Mass.; Developments and Results of Carburettors, Checkered and Checkerless, John H. Wolfe, Chairman, Consolidated Gas, Electric Light and Power Co., Baltimore, Md.; Tests on and Developments of Oil Sprays for Water Gas Machines, John H. Wolfe, Chairman.

UNCARBURETTED WATER GAS

The report of the sub-committee on Uncarburetted Water Gas made its report through the Chairman, H. C. Blackwell, Cincinnati, Ohio. The report was a collection of information on the general practice in eight different gas companies that are known to operate uncarburetted water gas plants.

A report was also read on Waste Heat and Illuminating Has Boilers by R. T. Kruger, Chairman, Rochester Gas and Electric Corporation, Rochester, N. Y.

BUILDERS' SECTION

The Builders' section made its report through the Chairman, Charles J. O'Donnell, The U. G. I. Contracting Co., Philadelphia, Pa. Reports were also read on Recent Developments in Gas Equipment by the U. G. I. Contracting Co., by C. J. O'Donnell; Recent Developments in Gas Manufacturing Apparatus of the Western Gas Construction Co., by T. W. Stone, of Fort Wayne, Ind., and one from the Gas Machinery Co., Cleveland, O., by W. E. Steinwedell.

REPORT OF THE CHEMICAL COMMITTEE

The report of the chemical committee was made through the airman, A. F. Kunberger, Chief Chemist, The U. G. I. Contracting Co., Philadelphia, Pa. The report of this committee was divided up into several parts and concerned the following: testing of ammonia and other materials, investigating corrosion, Editing the Gas Chemists' Handbook, purification material, light oil and light oil products, illuminating gas, gas oil, testing and evaluation of gas oil, purification, purifying materials, and proceedures.

The meeting closed with the presentation of the report of the committee on Condensing and Scrubbing, D. F. Flowers, General Superintendent and Engineer, St. Paul Gas Light Col., St. Paul, Minn.

Billing The Customer

Final Meeting Of Accounting Section Discusses Billing Systems and Customer Accounting

The gas men who have visited the Steel Pier during the past few days have remarked with great interest the exhibition that was shown on the platform at the extreme end of the Exhibition Hall. There a number of girls were actually carrying out the billing of customers in the Camden district of the Public Service Electric and Gas Co., of New Jersey. Not only accountants but gas men who generally pay but little attention to the accounting end of the business were found congregating on the platform watching the actual methods employed in billing customers for gas consumed during the past thirty day period. To the reporter of the American Gas Journal it appeared as if this effort on the part of the Accounting Section to popularize the work of the accountant was eminently successful. It was an interesting exhibit in every sense of the word and the Section and particularly the Exhibit Committee are to be heartily congratulated on their enterprise and good judgment in getting up so interesting an exhibition of one phase of the work of the accounting department of a gas company.

J. L. CONOVER REPORTS ON CUSTOMERS' ACCOUNTING

The first paper read at the

EDWIN L. RIEHA
Baltimore, Md.

meeting of the Accounting Section yesterday afternoon was principally concerned with the methods employed in the billing of customers and in customers' accounting in general as practiced by the Public Service Electric and Gas Co. of New Jersey. The billing method described in this paper is the one that was being used in the exhibit mentioned above. J. L. Conover, chairman of the committee presented the report.

UNDISTRIBUTED STRUCTURAL COSTS

The next report was read by J. I. Blanchfield, Assistant Auditor, The Brooklyn Union Gas Co., Brooklyn, N. Y., as chairman of the committee on Undistributed Costs. He said: "It behooves the accountant to 'have his house in order' and to be ever alert to make book figures of maximum service in support of property values, not only as to the aggregate investment, but also as to the respective elements of cost of the property." He discussed in detail the pertinence of the word "overheads" and mentioned the fact that very often this work was incorrectly employed. Another point that was brought up in the report was the ratio of undistributed to distributed costs.

STATE REPRESENTATIVES COMMITTEE REPORT

The final report read at the meeting was presented by A. L. Tossell, Secretary and Assistant Treasurer, The Peoples Gas Light and Coke Co., Chicago, Ill., chairman of the State Representatives Committee. He said that one of the most interesting indications of the change in economic status of the American people during recent years is the widespread substitution of checks for cash.

"No other industry comes into such close touch with the entire bill-paying public as the gas, electric and telephone companies, and any change in the method of paying bills has a decided effect on the way we do business," Mr. Tossell said.

"A few years ago, comparatively few people had checking accounts, and a trip to the gas company office, making loss of time and fare expense, was necessary. Gradually more and more people have opened bank checking accounts and gas companies began to realize they must make some alterations in their routine. Cash receiving clerks were twiddling their thumbs, and mail clerks were working overtime. Gas companies are interested in knowing whether or not this situation is to be a permanent one."

The American Gas Association is seeking to obtain this information through a special committee on state affiliation which has correspondents in every state.

Dinner Tendered by H. C. Abell, President of A. G. A. to the Officers and Directors and Officers-elect and Directors-elect and Guests, Tuesday Evening, October 13th at the Traymore.

(*Continued from page* 431)

the copies of papers read at the sessions printed early enough for timely distribution. As low as 13 per cent. were ready in time to permit study.

Mr. Alexander Forward, Secretary-Manager of the A. G. A., then greeted the delegates briey.

PROGRESS COMMITTEE REPORT

There followed the report of the Progress Committee, C. C. Krausse, chairman, who spoke of the many industrial data sheets gathered, and explained the defects therein that needed correction. The report closed with the following recommendations:

RECOMMENDATIONS

"The committee recommends that this work be carried on in the manner which has been previously outlined. We recommend that a new form be devised, one which is as explicit as possible, so as to leave little or nothing to the imagination of the man filling it in. The present committee will be glad to advise its successors regarding their opinion of the desired form of data sheet in detail.

"We wish to advise, however, that it will require a large amount of detail work to carry along this plan and to build up a satisfactory collection of performance figures. We think that some suitable organization is essential for collecting this data with a minimum of effort and therefore suggest that:

"1. A large committee be appointed with a representative of at least each of the large companies.

"2. A chairman be appointed who will not be burdened with other association work to an extent that he cannot give a great amount of time to this work.

"3. The chairman be empowered to support a small sub-committee on editing this work (a man to take charge of drying, another metal heating, etc.)

"The committee feels that the results obtained from this work will be well worth the effort expended. Not only will it serve to broadcast essential data to the industry, but it will more than repay each individual assisting in collecting this data by broadening and developing them as Industrial Gas Engineers."

The program continued with the report of the Committee on Gas Demand Recording Meters whose chairman is J. P. Leinroth, of the Public Service Electric & Gas Co., of Newark, N. J.

INSULATION

Next was an address on "Insulation" by L. E. Corer, of the Armstrong Cork & Insulation Co., of Pittsburg, Pa.

The speaker described the importance of insulation in the manufacture of industrial and domestic gas appliances and also its general importance to mankind. He noted the three methods of heat transmission and the essential qualities of insulation. Its application to gas-fired furnaces was described and also in the manufacture of gas. Its use in the construction of domestic appliances and in building construction was given consideration, whereby houses can be made reasonably heat-tight. The uses of corkboard is touched upon briefly. It closed with many tables of valuable data on the subject.

The meeting closed with a paper on "Control" by A. A. Pihlman, of the Consolidated Gas Co., of New York.

Accounting Section Exhibit More Attractive Than Ever

P. D. Warren, Chairman, Exhibit Committee, Explains Importance of Accountants and Accounting Methods

A few years ago an exhibit of accounting systems would have attracted about as much attention as the dropping of a plugged nickel on a plush sofa, but times have changed and today almost every executive and department head realizes that the accountant is the most necessary individual in the organization.

Some gas men who have not thought much about this subject may question this statement, and perhaps we should prove our case in advance of being cross-examined.

Let us follow down the organization chart and see just how the accountant is needed by the other branches of the gas business.

BOOKKEEPING AND ACCOUNTING

Your operating man may say that he does not need to know anything about bookkeeping, that his job is to make and distribute all the gas the sales department can put on the lines. Well, that is his main job, but he must rely on the accountant for accurate inventory figures that insure him a supply at all times of the materials necessary to make and distribute gas. He must rely on this same man to see that his expenditures during the year are charged to the proper accounts. When the big boss looks over the figures and demands to know why operating expenses have increased a certain percentage over last year, it's too late to wish that the accountant had been your closest friend and advisor. The books are closed and the demage is done. There are many chances for "hair line" decisions in making charges and if the operating man knows how the accounting man runs his business and works with him intelligently, both branches of the business are going to profit.

FINANCIAL MAN

Then let's take your man in charge of finance. There is generally a close contact between this man and the accountant, but frequently the relationship could be

improved. Your entire revenue is derived from the sales of gas and merchandise, and the accountant is the man you must look to to bill out your sales and get the money into the cash drawer with the least possible delay. He knows the necessity of perfecting his systems so that they operate to the best advantage of the watch dog of the treasury, and with the proper co-operation he will render the financial man excellent service, but don't forget the fact that you

P. O. WARREN
Peoples Gas Light & Coke Co.
Chicago, Ill.

must know him and his methods of operating to get the best results.

Now the sales manager may say, like the operating man, "I'll sell the goods but don't ask me to waste time on the details of how the accounts are handled." If he does take this attitude he is making a mistake, because the accountant can also do a great deal to make life easier for him when the big boss wants to know where all the profits have gone and why the results this year compare so poorly with last year or ten years ago. Just a little tip to the sales manager, and that is, he had better buy an occasional lunch for the accountant and talk these matters over with him with a view to having his friendship and esteem.

ACCOUNTING AND PUBLIC RELATION

Do you see any connection between accounting and public relations? There is a direct connection that every live public relation manager recognizes. A poorly operated accounting department can do more to gain the ill will of the public for your company than most any other branch of the business. What do most of your customers kick about? Their bills, of course. Now, it is up to the accountant to see that their bills are correct, that they are sent out on time, and that your complaint men do not have to acknowledge that "our bookkeeper made a mistake." Just a few cases of this kind and your company is advertised all over the neighborhoods of the customers that have been given this reply, in a manner that does not make for good relations with your customers. Mr. Public Relations Man, you, too, had better consider the advisability of buying an occasional lunch for the accountant.

ACCOUNTING EXHIBIT

Now this is all leading up to one thing, and that is the excellent program and exhibit that the Accounting Section has at the convention. At the meetings of this section you will hear discussed all phases of accounting, and these discussions will be interesting to every man in the gas industry. In addition to this there will be four large booths devoted to an elaborate display of different systems of accounting. You can hear these systems talked about in the meetings and you can see some of them in actual operation at the exhibit.

The committee has arranged for a large number of accountants to be in attendance at the exhibit at all times to explain the different systems shown and to tell the visitors how these systems can be adapted to the requirements of both small and large companies.

Gas Company Should "Doll" Up

Importance of Stove Individuality Emphasized

By F. M. Fluke of A-B Stove Co.

First let me say that my actual experience in selling and advertising has been over a period of about sixteen years and that in this period I have bought and sold, planned and executed nearly every form of advertising. I, too, have rung door bells—sold for manufacturers, jobbers and specialty houses, commodities ranging from outright novelties to high-priced specialties. Whether or not I have been successful in this work I have gained quite an insight into merchandising and this has been the chief contributing factor to my being today more of a merchandising man than a copywriter.

STORE INDIVIDUALITY

The commercial departments of the gas company has always overlooked one or two vital elements which have contributed more than any other single factor to successful retailing. This is the element of *store individuality*. Just as a manufacturer must have a good product in order to successfully advertise it, so must a retailer have a good store if he is to get very far with his retail advertising. A technical knowledge of the product does not in itself justify expectations for a large retail demand. Too often his analysis of what constitutes a retail business is superficial. He does not seem to recognize the fact that the highest aim in retailing is to create the impression among the public that the store is not a strictly merchandising proposition but actually an institution. Permit me to point out such outstanding successes as the John Wanamaker Company, Marshall Field Company, Barker Brothers, etc. The gas company starts out by actually being of an institutional character and perversely enough employs in its merchandising and sales policies principles almost exclusively confined to sensational merchandising.

SHOULD "DOLL" ITSELF UP

Briefly summing up, if the gas

company would simply "doll" itself up in such a manner that it was possible for a community to point to it with the same pride in its appearance as they do to any of its other local institutions, I think they would realize that what is chiefly lacking is not good will on the part of the public but faith in themselves. I have often observed that when a man calls at a home and says, "I am Mr. Blank from the gas company," no one "sics" a dog on him—and rarely do they slam the door in his face. As a matter of fact, he gets farther than the solicitor from most any store—and almost invariably is accorded the same attention (if he deserves it personally) as one gives the proprietor of the store.

The Technical Section's Work

A Gordon King Talks on Technical Matters

No matter how often we talk of the work of the Technical Section of the American Gas Association, we cannot really give it the space that it demands because of its great signifiance to the industry. We are, therefore, very much pleased to publish below A. Gordon King's statement regarding this work. As all gas men know, Mr. King is Service Engineer of the American Gas Association.

"In the early days of association work, when the greatest part of the annual meetings of the American Gas Institute were given over to the strictly technical side of the industry, the progress made and the outstanding developments were readily appreciated. But today, when the American Gas Association contains within its ranks active and energetic representatives of the manufacturing and distribution departments, domestic and industrial utilization engineers and salesmen, accountants, publicity men, manufacturers—all having their respective sections and devoting their time to studies particularly applicable to their problems—it is no easy matter to select from such a wealth of valuable material those developments which indicate marked progress in any given section of such a diversified industry.

"The strictly technical man whose work lies largely in production or distribution, must of necessity make haste slowly until he is sure beyond all shadow of doubt that any necessary expense involved in plant design, alteration, etc., is sound and economical. An industry under regulatory control and one in which the allowable return upon the fair value of the property devoted to the public service is limited and is relatively low, cannot afford to make unduly high expenditures without first completely satisfying itself that the money will be well spent and the returns in increased production, operating efficiency, reduced expense, etc., are reasonably sure of fulfillment.

TECHNICAL MEN ARE 'SOLD' ON INDUSTRY

"The technical men are completely 'sold' on the gas industry and are daily bending al their efforts toward the cheapest possible production of the most logical fuel for domestic, commercial and industrial purposes. They are endeavoring to secure maximum efficiency in manufacture with the utilization of raw material as economically as is possible so that our distribution men can carry to the homes and businesses of the country, through our salesmen, the fuel that everyone must use in the future in home, store and factory.

"As our industry becomes better sold on the necessity for an equitable rate and as the rate structure of the gas companies of the country come to reflect a form of rate incorporating proper allocation of all costs, so our sales will grow for all purposes. Industrial, commercial and domestic surveys of communities clearly indicate in many cases hitherto unsold markets for our product, and as this demand is developed so our technical men will provide the means to supply it, whether it be bituminous coal distillation in horizontal retorts, verticals, in coke ovens, or in water gas machines, or whether oxygen will be utilized aind complete carbonization realized, or whether low temperature carbonization will step into the field; which or any method is adopted the manufacturing engineer will be ready to furnish the gas as the demand is created because there is not a man in the industry from the highest to the lowest who is not thoroughly imbued with the truth and the sentiment of our slogan —IF IT'S DONE WITH HEAT, YOU CAN DO IT BETTER WITH GAS."

ADA BESSIE SWANN PRESENTED WITH DESK SERVICE

Popular Chairman, Home Service Committee, Is Honored

A happy event took place at the Home Service booth yesterday afternoon. Miss Ada Bessie Swann, of the Public Service Electric & Gas Co., Newark, N. J., Chairman of the Home Service Committee for the past four years, was presented with a bronze desk service by the members of her committee. Mrs. Luella Fisher, of the Home Service Department, Erie Stove Co., Erie, Pa., made the presentation. Major Alexander Forward was present.

Miss Swann has achieved remarkable success in furthering the Home Service work of the American Gas Association, and the presentation yesterday was only a slight token of the esteem in which she is held not only by the Home Service Committee but by the entire gas industry as well.

We congratulate Miss Swann and through her the members of her committee as well on the enterprise and whole-heartedness of their work in the Home Service field and also on the most interesting demonstrations that they have been giving throughout the convention at their booth on the Steel Pier.

On such rests eventual success of gas!

(*Continued from page* 428)

on a competitive basis and who can be taken on with an additional investment in plant proportionally very much less than the amount needed and already in use by the domestic load.

Mr. Purcell said that one large gas company reported it could handle an additional load of one hundred per cent. for house heating with an additional investment of only twenty-one per cent.

FINANCIAL PROBLEMS

Undoubtedly one of the most instruvtice and educational talks of the entire session was delivered when Fred H. Scheel, vice-president of the Utility Securties Co., of Chicago, Ill., arose to deliver his address entitled "Financing for the Future—Effect of Customer and Employe Ownership." The points brought out Mr. Scheel's talk very graphically illustrated by a series of charts showing the growth of the public utility business during the years 1919 to 1925 inclusive, and in particular the expansion in sale of gas securities.

Public Utilities, Mr. Scheel remarked, were receiving money at a rate higher than any one industry had ever received before. Furthermore, he said, the total of money involved in public utility securities made it at the present time the second largest corporate industry in the country, ranking only less in importance to the railroad industry with a capital investment of twenty-one billions of dollars.

SALES OF GAS SECURITIES

Leaving the subject of charts and statistics, Mr. Scheel now delved directly into the factors affecting a greater sale of gas securities to the consuming public. Perhaps one of the greatest mistakes made by the gas industry, Mr. Scheel pointed out, was the fact that the industry had not disassociated itself sufficiently from the general classification of public utilities. In other words, he said, the gas industry should talk more about the gas industry in itself, rather than about public utilities. Furthermore, he urged, the industry should take a greater interest in customer ownership of gas securities.

As to actual sale of gas securities, Mr. Scheel said:

GAS SECURITIES POPULAR

"Gas company securities are daily growing in popularity as the investing public comes to realize that the remarkable expansion of the industry in the past few years has been accompanied by very conservative financing.

"In the past decade the output of the manufactured gas industry has doubled and the demand for industrial gas has multiplied tenfold. A recent study of twelve leading American gas companies shows that in the past five years their gross income has increased 14.7 per cent. and net income available for dividends 235 per cent."

EDUCATING THE GAS EMPLOYE

In a paper entitled "Educating the Present Employe," B. J. Mullaney, vice-president of the Peoples Gas, Light & Coke Co., of Chicago, and chairman of the Association's committee on education of gas company employes, presented one of the most exhaustive investigations ever made by any industry to determine the effect of its policies on the mind of the public.

"Only that small number have any idea that they can appeal to authority other than the company itself in case of dissatisfaction or dispute," Mr. Mullaney reported. "The other 80 per cent. look only to the company for attention to their needs, their grievances or other incidents of service. These percentages hold good wherever such studies have been made.

"The percentages are about the same when the agencies, or influences or acts which tend to affect public opinion are studied. Only about 20 per cent. ever see, or hear or at best give heed to, our speeches before Rotary Clubs, our statements in the newspapers, our explanations of the economic importance and social significance of public utilities, or other methods of pinning medals on ourselves.

"The other 80 per cent. judge us entirely on their personal experiences with us and with our service, their judgment is affected far more by personal contact with employes than by any other factor."

"Service," Mr. Mullaney reported, "was first as an attitude-influencing factor, and stock-ownership, affirming the wisdom of customer-ownership policies, was second. As a matter of fact, service was nearly three times as strong as the next strongest factor and was almost as strong as the other four factors combined. The weakest factors were cost (rates) and newspapers.

"In other words, when service is satisfactory, rates are not much fussed about. It was found that the impression left by personal contacts with employes was twice as strong as all other factors combined in determining the customer's estimate of the service."

GEORGE H. SMITH
of Poughkeepsie
Dons Diving Suit to Lay Gas Mains Under the Hudson

ADVERTISING

The last of the programmed speakers at the session was Herman A. Groth, of the Wm. H. Rankin Co., of Chicago, Ill., who gave an illuminating discourse on the part that advertising would play in the future growth of the gas industry. Mr. Groth urged particularly that the industry give more importance to advertising of a national and educational charac-

ter. In the sale of appliances for the home, he furthermore emphasized the need of making more concentrated effort in the development of gas refrigeration.

THE 1926 CONVENTION

Committee reports presented at the final session were those of the Committee on the Presidential Address, Committee on Resolutions, and the Time and Place Committee. A. P. Lathrop, chairman of the latter committee, said that the concensus of opinion as expressed in an informal vote of the Association members, favoring holding the convention next year in some city located in the Middle West. The Secretary asked, however, that no place of meeting be named at this time, but that a formal vote of the entire membership be taken lated, preferably before January 1, 1926. Time for holding the convention was decided for October 11, 1926.

(*Continued from page* 430)

into organized channels of philanthropic service. Through this contact, they learned a great lesson. The woman found her job had not been fully taken care of at home, that she puttered over her work, using four hours of time, where she might have done it more efficiently in two. She found she had not fed her family scientifically, using the best food values needed for health. She made a scientific study of housekeeping such as she had never made before.

ALFRED HURLBURT
Vice-Pres. Equitable Gas Co.
Pittsburgh, Pa.

"That woman today is one of our best customer, for she realizes the value of accurate recipes and exact directions. She is looking for results. She fills her time full —but she realizes more than ever the value of home life. She has looked for and found the emancipation of rub-less Monday, of measured heat in the oven, of comfortable ironing, rolling the family linen under a yard long heated iron.

The radio, too, has helped, Mrs. Peterson went on.

RADIO WORK

"We know from our radio work how many thousands of home makers follow the Home Service Daily Table Talk. Brides learn to cook in our registered radio cooking classes. Boys and girls during the summer join our cooking classes, and housekeepers all year round follow the recipes and menus exactly.

"The automobile has taken the whole family out of doors when the glorious weather invites, and I do not think the family will prefer a chance road house meal to the delicious food which mother prepares if she will anticipate this need. We are meeting the auto right at the starting point and sending good home-cooked food along under the back seat. We are bidding the family Godspeed, the only kind of speed they can't be arrested for.

"The flapper and the long-haired boy are just the same home-loving girl and boy of olden times. I have had the genuine pleasure of helping thousands of them on their road to home making.

BUDGETS

"I have planned budgets for them, detailing every phase of their expense, giving them menus and recipes and helping them in every way. I have taught hundreds of earnest young brides how to cook. And I have warned the boys that marriage is not a one-way road, but a road where two must pull together, where two must figure and work and where wiping dishes now and then is the best of comradeship, and they have responded gloriously.

"They have started a new era when the man of the home will understand woman's work, so that man and woman will be equal partners and the children, as they come along, will have the utmost respect for the great profession of home making. They will look up to father not as a tyrant requesting only obedience, but as the head of the home, a companion, a wise counsellor and friend who understands and goes along with them and their problems. I honor, and throw out a radiation of love to the new father and new mother who keep young with their children.

"I have told the girl that when the man asks her to marry him, he is not looking for a dancing partner, or a social ornament. He is expecting to find in her the girl who will go into the kitchen and cook, for the kitchen is the vital center of the home, from which radiates comfort, and the man feels that and knows that.

MOST ENCOURAGED ABOUT FUTURE

"I feel most encouraged about the future of the American home, when I see the thoughtful care with which the young mothers rear their children. The babies are most carefully fed according to the direction of their own physician or the instruction given by the Children's Bureau at Washington, and the United States Public Health Department. They are

F. A. LEMKE
Gen. Mgr. Humphrey Co.
Kalamazoo, Mich.

cared for according to schedule, and I think the low rate of infant mortality is one of the most encouraging signs of better home making. Never in the history of the United States have we saved more babies.

"The only alarming propaganda which undermines the home is the insiduous work of manufacturer and advertiser who assume that women love personal ease and comfort above all things. They assume that women are inefficient and lazy and do not like to stay at home. Great advertisements urge women to Eat at the Blank Hotel, or they suggest Do not go home to cook, buy your food," or again they say Breakfast in three minutes with this ready cooked cereal.

WORK OF HOME SERVICE

"It is the work of a Home Service Department to send back strong, forceful, true propaganda to counteract this wrong attitude. Frankly, we have felt the loss of gas sales among our women customers from less home cooking, and it is the avowed purpose of the Home Service Department to increase the sales in this greatest market the Home. It is the work of home service to meet this propaganda on its own ground and teach women that cooking is the easiest thing in the world and altogether the most delightful, because of the cheer of the family dinner table. I have always said that the reason women do not cook is, not because they don't like it, but because they don't know how, and in our practical, serviceable demonstrations, we teach them the simplicity and satisfaction of home cooking. When they have tasted its joys in the praise of husbands and children around the family dinner table, when they have seen how it builds health and success, when we point out to them the chances for character development in the children, they are going to feel as we feel, that it is essential.

SUCCESS OF HOME SERVICE ON TEACHING

"I build the success of home service on teaching that home making is a joy, not a job, and I repeat over and over again that home making is the most glorious profession in the world. For I heartily believe that a woman cannot be a successful home maker until she is thoroughly sold on her own job. She has to think that her home is the best place in the world, and then she is bound to make it so for the others.

"I call it the psychology of happy home making, this doing the work with a smile and a song that comes from the heart. Every woman can make hetr family think there is no one who can cook as she can. When she offers them a dish of golden brown cheese biscuits I tell her to say 'Isn't that good?' She believes it and they will believe it. It is an important point in home cooking psychology.

THE WORD "HOME"

"I love to take the HOME and let it linger on my lips. To me it is the sweetest word in all the language, for it means a place of joy and comfort, a place where downy heads find nurture of body and soul, a place where true partnership exists for man and woman, with a comradeship which endures through the golden years of life.

"It is no wonder, then, that I feel it my greatest privilege, as Director of Home Service, to carry this propaganda of home cooking to our women customers, for I truly believe that the woman in her kitchen is the heart and soul of the home. I know that it takes the closest co-operation of every member of a home service staff, the officials in the company, yes, the gas industry, to make Home Service the big, vital, enduring force in the American Home—to make it reach the fullest possibilities of our greatest market.

MUSIC WAS PROVIDED

Preceding Gen. Hannah's address, the U. G. I. Music Masters, a splendid orchestra, played a diversified program, which was heartily acclaimed by the assembled audience. Between the two talks, they again obliged. And when they played their "Old Timers' Waltz," the entire audience sang along with them, as one after another of the old familiar melodies started.

Numerous Technical Developments Have Been Made

During the past ten years, as L. I. Willien, Chemical Engineer, Charles H. Tenney & Co., Boston, Mass., says, more progress has been made in the technical branch of the industry than in the preceding fifty years, and greater progress is expected in the next ten years than in the past decade. It is interesting to note the outstanding contributions made by technical men to the gas industry, as given below in Mr. Willien's statement.

"More progress has been made in the gas industry during the past ten years than in the fifty years preceding that, and I believe more progress will be made in the next ten years than in the past ten years.

"The developments in the manufacturing end during the past years have been quite numerous. A few of them are as follows: Liquid purification, automatic operation of water gas sets, automatic charging of water gas sets, checkerless carburetors, backrun, electrical precipitation of tar, recording calorimeter, waste heat boilers, steaming of vertical retorts and coke ovens, outside producers, use of bituminous coal in water gas manufacture.

"The interest which the universities and technical schools are taking in the gas industry today is most encouraging. The correspondence course started this fall by the A. G. A. under the direction of Professor Morgan, of Columbia University, is an excellent thing. When our institutions of learning show an interest in an industry, that industry is sure to progress.

"Last, but not least, the American Gas Association has been an important development of the gas industry. I have been active in the committee work of the association for the past few years, and each year there has been an increasing interest in committee work. The meetings have been better attended and the discussions more interesting. The attendance at the conventions has increased tremendously and there have been more open discussions at the meetings. With such spirit and co-operation the gas industry is bound to progress, and progress rapidly."

JOHN F. PARKER AT ROPER BOOTH

After an absence of many years we are glad to note the presence of John F. Parker at the booth of the George D. Roper Corp. Mr. Parker has been on hand regularly to greet all the many friends he has in the gas industry.

"JAKE" JONES WINS BEAUTY CONTEST

Jacob ("Jake") B. Jones of Bridgeton Gas Co., Bridgeton, N. J., has the distinction of winning the beauty contest conducted by the U. G. I. Contracting Co. The announcement of the winner was made by L. L. Moore, Sales Engineer, the U. G. I. Contracting Co., Philadelphia, Pa., at the Steel Pier, last night where thousands of gas men and their guests assembled for a Monte Carlo frolic. A handsome loving cup properly engraved was presented to "Jake."

A CORRECTION

Our attention has been called by Mr. Apmann, of the Surface Combustion Co., New York, that in the report of the Wednesday meeting of the Industrial Section our reporter neglected to mention that Mr. Munroe reported that it was the opinion of the Executive Committee that the committee of seven on research work in conjunction with the Surface Combustion Co.

NOTICE

We regret that in the daily press of work attendant on getting out the daily Convention Edition the name of the Home Incinerator Co., of Milwaukee, Wis., was omitted from the Index to Advertisers. Their advertisement appeared on page 65 of the American Gas Journal editions of Oct. 13 and 15, 1925.

OMITTED COPY

The editor desires to say that certain interviews and statements have been omitted for want of space and will be published in the Oct. 17, 1925 issue.

Registration of A. G. A. Members up to 5 P. M., Oct. 15th. List of Guests registered can be found in Booth 510-B on Steel Pier.

A

Aikin, H. C.; Ardmore, Pa.; Traymore

B

Barry, Walter D.; Camden, N. J.
Beard, F. A.; Flint, Mich.; Breakers
Berry, E. G.; Toms River, N. J.; Marl.-Blan.
Betts, Ed. D.; Trenton, N. J.; Dennis
Bishop, Wm.; Brooklyn, N. Y.; Haddon Hall
Blanchard, Frank L.; New York City; Traymore
Butler, Joseph; Syracuse, N. Y.

C

Crane, Henry W.; Elizabeth, N. J.

D

Dashiell, P. T.; Philadelphia, Pa.
Davenport, Chas. F.; New York City; Strand
Diblin, Geo. A.; Philadelphia, Pa.
Donahue, E. J.; Jersey City, N. J.; Breakers

F

Fowler, Philip D.; Philadelphia, Pa.

G

Green, J. W.; Yonkers, N. Y.; Ambassador

H

Hagerman, Oliver S.; New York City; Breakers
Harriman, H. M.; Brooklyn, N. Y.
Hedley, Wm. S.; East Orange, N. J.
Hoffman, Howard, Narberth, Pa.; Seaside
Holzer, E. G.; Norfolk, Va.; Breakers
Houston, Gray J.; Toledo, O.; Ambassador

J

James, Wm. H.; Baltimore, Md.; Dennis
Jones, David R.; Flushing, L. I.; Dennis

K

Keene, A. M.; Yonkers, N. Y.; Ambassador
Kelly, F. J.; New York City; Dennis
Kenny, Thos. J.; Yonkers, N. Y.; Traymore
Kirch, L. A.; Hammond, Ind.

L

Long, Robert; Camden, N. J.

M

Minard, E. D.; Hackensack, N. J.; Craig Hall
Morley, John; Englewood, N. J.; Ambassador
Munyan, E. A.; Hammond, Ind.

N

Naile, Wm.; Reading, Pa.; Marlborough-Blenheim
Neighbour, J. H.; Paterson, N. J.; Dennis
Noble, Victor, A.; Hackensack, N. J.; Ambassador

P

Postles, J. Van. G.; Phila., Pa.; Marlborough-Blen.
Pratt, Chas. O.; Detroit, Mich.; Chalfonte
Pruyn, J. W.; Yonkers, N. Y.; Traymore

Q

Quackenbush, C. H.; Wilmington, Del.; St. Charles
Reid, J. F.; New York City; Chalfonte
Roberts, C. V.; Philadelphia, Pa.; Seaside
Root, W. A.; New York, N. Y.; Chalfonte

S

Sanford, H. S.; Pittsburgh, Pa.; Traymore
Sharp, A. B.; Steubenville, O.; Day
Small, Norman C.; East Orange, N. J.
Smith, Wm. F.; Brooklyn, N. Y.; Haddon Hall
Steere, F. W.; Detroit, Mich.; Chalfonte
Swartz, N. B.; Mount Carmel, Pa.; Seaside

T

Tallant, Ralph K.; Fairmount, W. Va.; Traymore
Tenney, Albert B.; Boston, Mass.; Traymore
Titzel, R. John; West Conshohocken, Pa.
Tutwiler, C. C.; West Conshohocken, Pa.; Day

U

Underhill, Harry L.; Baltimore, Md.; Traymore

W

Warner, Geo. H.; New York, N. Y.; Haddon Hall
Wilbraham, Rueben, A.; Camden, N. J.; Day

American Gas Journal

SIXTY SEVENTH YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

Daily Edition, published in Atlantic City, October 13, 14, 15, 16, 1925

S. G. KRAKE, President-Treasurer CHAS. S. MYERS, Vice-President A. M. GLEASON, Secretary

ISMAR GINSBERG, Editor

terial Offices: Atlantic City, Chalfonte Hotel Booth Telephone, Steel Pier Marine 3760

Water Gas*

Report of 1925 Committee

J. H. Warnick

Chairman, Elrama, Pa.

INTRODUCTION

OPERATORS' SECTION

Francis E. Drake

Chairman, Lynn Gas & Electric Co., Lynn, Mass.

THE work of the Operators' Section of the Water Gas Committee during the past year has been a continuation of five of the subjects started last year; and, in addition, six new ones have been added.

The committee has given each obvious subject a great amount of careful thought and consideration, and no one has been touched upon unless the development of that particular subject has become far enough advanced to warrant serious consideration.

Last year several problems were discussed theoretically, and this year they have been treated practically, giving, in so far as possible, actual operating results.

No conclusions have been drawn by your committee, as they felt that was beyond their province; but enough figures have been submitted, so that operators throughout the industry may draw their own inferences.

Pier Process

The outstanding feature of the report on Soft Coal Operation is the development of the so-called "Pier Process." A description of this method and results obtained by its use are given in full; and we believe they warrant careful perusal by all interested in this subject.

The Back Run process was treated theoretically last year. This year actual operating results have been compiled from many of the plants using it. We believe these will prove of material value and interest to the industry at large.

In the 1925 report a general description was given of a standard water gas set modified for the use of heavy oils. This year the actual operating results, obtained with this machine over a considerable period of time, are given.

Oxygen in Water Gas Making

The report of the "Use of Oxygen in Water Gas Manufacture" is a description and theoretical discussion of a process for the manufacture of oxygen, as developed by the Jefferies-Norton process. This is a unique process which, if made a commercial success, may revolutionize the methods of gas manufacture. The plant, as installed at Worcester, Mass., while strictly experimental, is, nevertheless, large enough to demonstrate in a practical way the feasibility of its operation.

The Refractories Committee report is a continuation, and gives further information as to results obtained and costs. This section should prove most interesting to all operators and builders.

The use and development of exhaust steam regenerators is yearly becoming of greater importance. The results of actual operations by pioneers in this method of manufacture are of incalculable value to the gas engineer. This section has been covered most comprehensively by men thoroughly familiar with the use of exhaust steam in all its details. A careful study of the points brought out, we believe, will be of material assistance to all operators interested in reducing the cost of water gas manufacture.

The reports on "Results on Carburettors, Checkered and Checkerless" and "Development of Oil Sprays" should be of practical assistance, as actual operating results are given.

Waste Heat

The section on "Waste Heat and Illuminating Gas Boilers" has been ably covered by a committee quite conversant with the subject and by men having had a vast amount of both practical and theoretical experience. The results as given should be of great value and we believe will repay all who give this section careful study.

The question of oil gas manufacture has always been strictly a Pacific Coast subject, but your committee felt that it was of sufficient importance to warrant calling attention to the fraternity at large. This section covers a general description of both the "Two Shell" and the "Straight Shot" type, with actual operating results obtained both on the Pacific Coast and at a plant in New England. We believe a careful perusal of this section will be of interest to all of the industry.

The Chrisman Down Run is a comparatively new development, but one which has commanded the attention of the industry for some months past. We feel that the paragraphs covering this subject will be a valuable addition to the literature on the manufacture of water gas.

Oil Efficiencies

At the Chicago meeting last March the Managing Committee brought up the question of this committee recommending a uniform formula for figuring "Oil Efficiencies." Letters were sent out to each member of the Water Gas Committee and 17 replies were received.

Of the 17 replies, two were from oil gas companies, the others from companies manufacturing carburetted blue gas.

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*Presented at Thursday meeting, Technical Section, A. G. A. Convention, Atlantic City, October 15, 1925.

We find that for oil gas, as stated in the two letters, there does not seem to be any formula whereby oil efficiencies can be shown that will be comparable with those commonly expressed by water gas companies. The only formula which we could find from their reports was:

$$\% \text{ over-all efficiency} = \frac{\text{B.t.u. in Gas}}{\text{B.t.u. in total Oil}}$$

Of the companies manufacturing carburetted blue gas, we find 13 use the same general formula as in Massachusetts:

$$\text{Oil Efficiency} = \frac{\text{B.t.u. per cu. ft.} \times 1000 - [(1000 - ox)\, g]}{x}$$

Where x = oil, gals. per M cu. ft. of gas (standard conditions, 60° F. & 30" Bar.

o = cu. ft. gas made per gal. of oil

g = heating value of blue gas made

This formula has been condensed by some to the form:

$$\text{Oil Efficiency} = \frac{1000\,(.001\,ogx + \text{B.t.u.} - g)}{x}$$

The only difference in the use of these formulae is for the value of o and g. On these points there is a variety of opinion. The average of all the answers received gave o the value of 67.9 and g the value of 297.10. Both of these values are, of course, dependent upon raw material and operating conditions.

From the cursory analysis made by this committee it is certain that some uniform formula should be adopted by this association; but the committee does not feel that they have had sufficient time to make a thorough analysis and study of the subject. They, therefore, recommend that no action be taken on a definite acceptance of any formula at this time; but that the matter be brought to the attention of the association and that the subject be held over for the 1926 Water Gas Committee to analyze thoroughly and make definite recommendations.

A request was received during the year from association headquarters for assistance from this committee in the gathering together of data for the Revised Cathechism. We felt that the proper way to handle this matter was to appoint a sub-committee geographically situated so that the entire country was well covered. This was done and the sub-committee known as the "Educational Section of the Water Gas Committee" formed. This committee is not only in a position to help facilitate the publication of the Revised Catechism, but is also in a position to answer operating questions which may be propounded by operators throughout the country.

Use of Bituminous Coal as Generator Fuel

W. G. Rudd
Chairman, Sub-Committee

INTRODUCTION

DURING the past year the use of bituminous coal as generator fuel has been advancing all over the country, some plants in the experimental stage, while others have passed the experimental stage and are using bituminous coal exclusively. With the application of the Pier Process, which is a joint invention of W. J. Murdock, O. B. Evans and E. E. Lungren, the main disadvantages with the use of coal which have been the reduction both in capacity and fuel economy, have been removed. With the Pier Process the capacity and fuel economy closely approaches that of good coke operation.

Observations show that the area of activity in the fuel bed extends from the walls about 18 to 24 inches toward the center, while the center part shows a section of unconsumed fuel and practically no activity. To eliminate this condition the Pier Process, which consists of a refractory cylindrical pier that is built in the center of the generator, and cores out the inactive section of the fire, gives additional radiation wall surface and more uniformly active fire. Instead of having only a ring of activity within the outer wall, there is also a ring of activity about the pier wall, and with proper pier design both rings can be caused to merge. This results in uniform active fuel bed and uniform temperature across horizontal sections.

The clinker formation is practically flat and easily removed.

The oil per "M" using bituminous coal is reduced, due to a better quality of blue gas.

The results on bituminous coal at Plant No. 1 will be found in Table No. 1 of Mr. Novak's paper—Use of Illinois Coal with the Pier Process.

The cycle used in the 11'-0" sets with Illinois Coal is as follows:

Time	5½ min.
Blow	35%
Run	65%
Down Run	49%
Air Purge	17 seconds
Blow run on cycle	17 seconds
Air per minute	7000 cubic feet
Steam per minute	113 lbs.

2 Straight runs after coaling, rest split runs.
2 Min. blow run into holder after coaling.
Coal every 7 to 9 runs.
Charge—3200-4500 pounds.

The table shows that with Jackson County Unscreened Coal with pier an increase of 48 per cent in capacity and a 13.1 per cent decrease in fuel are noted, while with screened coal a 43.5 per cent increase in capacity and a 9.5 per cent decrease in fuel over that of operation without pier.

With Indiana coal an increase of 62.0 per cent in capacity and a 13.1 per cent decrease in fuel are noted with pier.

Summary of Results at Plant No. 2

Size of Set	10′-6″	10′-6″
Kind of Fuel	Bituminous Coal Jackson County	Bituminous Franklin County
Size of Fuel	Lump Forked	6″×3″ Lump
Pier Process	With pier	With pier
Make per Set Day (M)	2,670	3,230
Gross Fuel Lbs. per M.	33.15	31.90
Blown over Fuel Lbs. per M	.46	.27
Net Fuel Lbs. per M	32.69	31.63
Oil Gals. per M	3.14	3.16
B.t.u. of Gas	557	557
Lbs. Steam made per M, W. H. Boilers	52.58	56.20
Length of Test	36 Hours	24 Hours

USE OF ILLINOIS COAL WITH PIER PROCESS

M. P. Novak, Coal Products Mfg. Co., Joliet, Ill.

Summary

The use of the Pier Process in connection with Illinois coal and other bituminous coals has shown the following advantageous results:

1. The gas-making capacity of the set is very materially increased over previous operation with the same fuel.
2. The fuel required per M for any given fuel is reduced as compared to previous operation with the same fuel.
3. The clinker formation is practically flat, and is very easily removed with very low carbon losses. Records show a reduction in clinkering time of 30-40 per cent.
4. The oil required per M is reduced because of better quality of the Blue Gas.
5. The amount of fuel blown-over from the fire is materially reduced.

These results obtain because the tendency toward arching and matting is eliminated; the fuel bed is more uniformly permeable to the blast, permitting a higher rate of blast; and the fuel bed presents a larger body of uniformly incandescent fuel, which has been heated to the proper temperature for the progress of the water gas reaction.

Note: The application of the Pier Process is a joint invention of W. J. Murdock, O. B. Evans and E. E. Lungren, to whom acknowledgments are accorded.

REPORT OF USE OF BITUMINOUS COAL—RESULTS AT VARIOUS PLANTS

W. G. Rudd

GAS ANALYSES WITH MIXTURES OF SOFT COAL AND COKE IN WATER GAS

L. J. Willien, Chemical Engineer, Chas. H. Tenney & Co., Boston, Mass.

REPORT OF SUB-COMMITTEE ON BACK RUN PROCESS

A. H. Anderson, Chairman, Detroit City Gas Co., Detroit, Michigan

REPORT OF THE SUB-COMMITTEE ON MODIFICATION OF WATER GAS SETS FOR USE OF HEAVY OIL

W. D. Stewart, Chairman, Western United Gas & Electric Co., Aurora, Illinois

REPORT OF SUB-COMMITTEE ON USE OF OXYGEN IN WATER GAS MACHINES

A. C. Frey, Chairman, Worcester Gas Light Co., Worcester, Mass.

REPORT OF SUB-COMMITTEE ON REFRACTORIES

Walter M. Russell, Chairman, Massachusetts Lighting Companies, Boston, Mass.

GENERAL CONCLUSIONS

The following general conclusions appear to be warranted after an experience of several years with these linings in practically all sizes of machines:

1. The use of Bernitz blocks will increase the capacity of any machine.
2. Fuel and oil results should be improved.
3. There should be a practical elimination of all clinker adhesion to the generator walls, and clinkering labor thereby greatly reduced, also clinkering time much shortened.
4. The use of small shapes has been definitely established as being advisable. Not only the main body of the lining, but the arch tile over the doors must be of Bernitz construction, that is, perforated blocks.
5. Circulation of air must be maintained throughout the entire carborundum lining to prevent cracking of the blank blocks in the upper part of the generator. Experiments are now being made to perfect a circulation system.
6. The use and cost of these linings is fully justified by the results obtained.

USE AND DEVELOPMENT OF EXHAUST STEAM REGENERATORS

R. E. Kruger, Chairman, Rochester Gas & Electric Corporation, Rochetser, N. Y.

REPORT ON OIL GAS MACHINES

Robert Lindsay, Chairman, New Bedford Gas & Edison Light Co., New Bedford, Mass.

REPORT OF SUB-COMMITTEE ON DEVELOPMENTS AND RESULTS OF CARBURETTORS, CHECKERED AND CHECKERLESS

John H. Wolfe, Chairman, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

REPORT OF SUB-COMMITTEE ON TESTS ON AND DEVELOPMENTS OF OIL SPRAYS FOR WATER GAS MACHINES

John H. Wolfe, Chairman, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

REPORT OF THE UNCARBURETTED SECTION OF THE WATER GAS COMMITTEE

H. C. Blackwell, Chairman, Cincinnati, Ohio

The committee report that of the nine gas companies of which they know that are engaged in the manufacture of uncarburetted water gas, eight have furnished information in answer to their inquiries, namely:

Iroquois Gas Corporation, Buffalo, N. Y.
Elmira Water, Light & Railroad Co., Elmira, N. Y.
Empire Gas & Electric Co., Geneva, N. Y.
Republic Light, Heat & Power Co., Tonawanda, N. Y.
Louisville Gas & Electric Co., Louisville, Ky.
Equitable Gas Co., Elrama, Pa.
Union Gas & Electric Co., Cincinnati, Ohio.

Blue gas manufactured by the Empire Gas & Electric Company, Geneva, N. Y., is used as a fuel for coke ovens, and in the case of the Republic Light, Heat & Power Company, Tonawanda, N. Y., a 9-foot water gas set is held as a standby, to be used in case of interruption to the gas supply, now being purchased by that company from coke ovens. All other companies, from whom they have secured information, are using the gas manufactured for mixing with natural gas.

Load factor under which machines are operated is every low, due to the fact that gas is manufactured primarily during the winter season, when it becomes necessary to augment the supply of natural gas with manufactured, in order to meet the demands resulting from residential heating load. As a rule, the only time carburetted water gas is manufactured is to meet abnormal demands in extremely cold weather; in normal winter weather, blue gas is manufactured to mix with natural gas.

Plants operated by the Empire Gas & Electric Company, Geneva, N. Y., and the Equitable Gas Co., Elrama, Pa., are not equipped with carburettors; at all other locations, however, either blue gas or carburetted water gas may be produced.

Waste heat boilers are used on 7-12-foot sets, operated by the Equitable Gas Company, and provision for future installation of waste heat boilers has been made by several other companies.

Size of the water gas equipment in service varies from 9-foot sets to 12-foot sets, there being 1-11-foot set and 19-12-foot sets, in the various installations.

It is interesting to note that of the eight plants reporting, those located at Elmira, N. Y., Geneva, N. Y., Elrama, Pa., and Cincinnati, Ohio, have automatic operated equipment installed, the others are straight hand operated.

Coke is used as generator fuel, in all plants, with the exception of the plant at Louisville, Kentucky, where coke as well as several of the West Virginia and Kentucky coals are used.

Reports all indicate that electric motors are used to a very great extent in the operation of water gas sets.

REPORTS ON WASTE HEAT AND ILLUMINATING GAS BOILERS

R. T. Kruger, Chairman, Rochester Gas & Electric Corporation, Rochester, N. Y.

*Theoretical Discussion—C. A. Schlegel.

Methods of burning down and cleaning Illuminating Gas Boiler—R. E. Kruger.

Rochester Method of burning down and cleaning Illuminating Gas Boilers—R. E. Kruger.

Results obtained as reported by various companies—R. E. Kruger.

*Excerpt from paper read by Mr. Schlegel at New England Association of Gas Engineers Meeting, Providence, Rhode Island, February 18 and 19, 1925.

REPORT ON CHRISMAN DOWN RUN PROCESS

H. K. Seeley, The United Gas Improvement Co., Philadelphia, Pa.

Theoretical Discussion—H. K. Seeley.

*Results at Reading Pa.—L. W. Seltzer.

Results at Des Moines and Sioux City, Iowa—H. K. Seeley.

*Paper presented at Pennsylvania Gas Association meeting, December 4, 1924.

BUILDERS' SECTION

Charles J. O'Donnell, Chairman, The U. G. I. Contracting Company, Philadelphia, Pa.

RECENT DEVELOPMENT IN GAS EQUIPMENT BY THE U. G. I. CONTRACTING CO.

C. J. O'Donnell

REPORT FROM THE GAS MACHINERY CO., CLEVELAND, OHIO

W. E. Steinwedell

RECENT DEVELOPMENTS IN GAS MANUFACTURING APPARATUS OF THE WESTERN GAS CONSTRUCTION COMPANY

T. W. Stone, Ft. Wayne, Ind.

(Note—This report will be found in full in the Proceedings of the A. G. A.)

Customers' Accounting System*

As used by the Public Service Electric and Gas Company

J. L. Conover

Auditor, Gas Department

THE commercial department of Public Service Electric and Gas Company, which is the department responsible for customers' accounting, is divided into six divisions with a division agent in charge of each district. There are 27 district offices; the furthest from the general office, located in Newark, N. J., is at Camden, 85 miles away. The general office maintains control of the commercial office accounting through a system of monthly reports and a force of traveling auditors who twice each year audit the accounting records of each commercial office.

*Read at the Thursday Meeting of the Accounting Section of the American Gas Association, 1925 Convention, Atlantic City, Oct. 15, 1925.

The Meter Order System

Our meter order system was developed by consolidating forms previously used exclusively for either electric or gas work of a similar or allied nature. In addition to consolidating the forms, our meter order system was further developed by combining former forms covering different operations but for which the same information in each case must be given. The process of consolidating and combining the forms has reduced the number of forms for both electric and gas from 19 to 5. One of these, the leak order, being a strictly gas form permits of no consolidation with an electric form.

When the originals of the completed meter orders are received in the customers' service department the morning after they are executed, the copies that are being held as a check upon the return of the completed orders are taken from the file of pending orders as outlined above.

In this way we have in the pending file copies of orders incompleted as of the close of the previous day's business.

A summary of the orders is made up by the distribution department and forwarded each day with the meter orders completed on the previous day. This summary shows the number of meters set and removed, by sizes and types of meters.

Upon receipt of the completed orders and the summary in the customers' service department, the orders are summarized to determine the number of meters set and removed by sizes and types as a check upon the summary made up by the distribution department. The distribution department summary is sent with the completed orders to the bookkeeping department. The distribution department and the bookkeeping department as well as the central meter record department, when the orders reach that point, all summarize the completed set and remove orders by sizes and types for the month and at the end of the month the distribution department and the bookkeeping department send a detailed report of meters set and removed during the month to the central meter record department, where these two reports are checked with the summary made up by the central meter record department. In this way we maintain an accurate control of the number of meters in service in each district.

Complaint Order

The complaint order is made up in triplicate and by check mark opposite the proper heading, designation is made as to whether it pertains to electric or gas service and dispatch to the proper distribution department is made accordingly. This order is made up from either the memo for order or direct upon receipt of complaint from customer either in person at the counter, by telephone or otherwise.

The original and duplicate copies of this form are sent to the distribution department, the triplicate being held in the pending file of the customers' service department at the commercial office. Upon completion of the order the original is returned by the distribution department to the customers' service department, where the triplicate is removed from the pending file and placed in a permanent file. The original is then sent to the bookkeeping department for accounting purposes and charge to customer, if any, for work performed.

Leak Order

The leak order originates from the same sources as the complaint order. However, all leak reports are placed in the emergency class and as soon as received telephone advice is immediately given the gas distribution department. The report on the standard form is confirmation to the gas distribution department of the telephone information furnished. The dispatch and routine of the copies of this form follow the same procedure as that of the complaint order except as to the forwarding to the bookkeeping department, which is not done in the case of leak orders.

Follow-up of Orders

The distribution department each day forwards to the customers' service department a report covering all orders which were not completed on the previous day.

The reason for delay in the work is shown on these reports which is entered on the triplicate copy of the original order held in the customers' service department file.

The customer is then notified by postcard of the reason for the delay. If the delay is such as to require action on the part of the customer, the detail is given to him and he is requested to advise the customers' service department as soon as the condition is remedied.

Meter Record Department

The meter record department keeps a detailed history of all meters owned by the company. This history is kept in book form which shows the status of the meters, that is, whether in service or in stock; whether condemned or sold.

Upon receipt of the completed orders in the meter record department the meter orders are entered in the meter history book. This entry shows the date meters were set or removed, the index and account number, so that if desired the exact location of a meter in service may be determined.

The results of all meter tests are also entered in the meter history record. In entering set indexes, the index as shown on the meter order is compared with the last remove index to make sure the set index is correct. By comparing the set index with the remove index we have found meters set and removed 3 or 4 times at the same index. These meters are removed at once for special test and in a few cases while it was found the meter showed consumption upon test, when it

was opened it was found that the dial wheels did not properly mesh; therefore no consumption was recorded.

Indexing Meters

The continuous method of indexing meters is followed, the meters being regularly indexed in the first 21 working days each month, Saturdays excepted, with the exception of February and November. In February and November meters are indexed in the first 21 working days, Saturdays included as full working days. On Saturday mornings, when the indexers are not regularly indexing meters as above, they are covering their routes for missed indexes.

Each commercial office district is divided into 21 routes and each route, where necessary, is sub-divided into units. For example, with 21 indexing days in the month if it takes 21 man days to index the meters there would be 21 routes and 1 unit (or one indexer) to each route; if it takes 63 man days to index the meters there would still be 21 routes but 3 units (or three indexers) to each route.

Each unit (index book) is indexed as to the streets in the unit. If a unit comprises 8 streets, each street is numbered, the first street in the unit being number one, the second number two, etc. By consolidating the route number, unit number and street number, an account number is established. For example, Fulton Street in the Newark district is account number 7-26-4, designating that the account is contained in route book No. 7, unit No. 26, and the fourth street in the unit. The house number at which the meter is in service, as shown on the addressing plate, completes the acocunt number but is not made a part of the account number as placed on the indexing sheet.

Billing

The billing for our entire system (power excepted) is done at our central billing department.

Our billing schedule calls for all meters indexed on a certain day to be billed on the next working day. This schedule is practically maintained and at certain times in the month the billing for the previous day's indexing is fully completed well before closing time.

Extra Incentive Wage Plan for Bill Clerks

In order to compensate the bill clerks on the basis of their performance but mainly to encourage accuracy in billing, an extra incentive wage plan was put in effect in our central billing department as follows:

The base rate of all employees remained as was, but each employee is expected to earn their base rate under the extra incentive plan. New employees are allowed two months to become efficient, before they are placed on the extra incentive wage plan.

Compensation under the extra incentive wage plan is at the rate of 55 cents per hundred bills.

Five cents is deducted, from the amount earned, for each error made in billing.

The bill clerks are guaranteed their base rate for a month but any amount

Cycle Balancing of Customers' Accounts

The cycle method of balancing customers' accounts is used. By this is meant that following the meter indexing plan the work of the month is divided into twenty-one parts. Each day for twenty-one days a route is balanced.

The unpaid accounts become delinquent at the close of the day the meters are being indexed; for example, Route No. 6 was indexed on October 7 and will be indexed on Saturday, November 7, due to Election Day, November 3, being a holiday and the fact that in November we index on Saturdays. The unpaid accounts on Route No. 5 therefore become delinquent for November (October sales) as of the close of business on November 7 and the route is due to be balanced on November 9. This schedule for balancing is continued throughout the month until all routes have been balanced.

The total of the outstanding for all the routes is the amount delinquent, which amount is separated into two amounts so as to show amount delinquent last current month and amount delinquent prior to last current month as shown on the report of outstanding accounts and subsequently outlined.

(The complete report will be found in the Proceedings of the A. G. A.—Editor.)

Rate Structure *

Report of 1925 Committee

Ewald Haase

Chairman

A FORWARD look, an estimate of the future, is never so real and with power to spur onward as when made in view of the way traversed and of progress already made.

The committee believes that it cannot do better than to survey the rate situation as it shows improvement on the flat rate which has so dominated the gas business. Reference is made to "A Comparative Study of the Rates Appearing in Rate Lists Nos. 1, 2 and 3," an article by A: Gordon King, Service Engineer of the A. G. A., page 327, A. G. A. Monthly, Vol. VII, No. 6, June, 1925.

On Rate Structure in General

For more than twenty years there has been active discussion in the gas business of the elements of cost underlying the service of the gas utility, and of policy with regard to rate structure based upon such costs. It must be said that little progress has been made in the actual adoption of rate structure along these lines, and yet there are signs that the day is dawning. When one state commission approves a fixed charge of $2 a month to cover "customer costs" and "demand costs," and in addition to which gas used is paid for at a rate per thousand cubic feet, it must be said that a beginning has been made in the adoption of a rate structure based upon costs. No doubt a decision of this kind was arrived at only after clear presentation of a case of great necessity. The companies are numerous who have equally urgent necessity of a change in their rate structure that will enable them to sell gas in volume, and of such load factor, as to make their plant investment pay better and be of greater usefulness to the community served, and enable them to supply new uses at a cost which such uses can bear.

Fundamental Principles in Rate Making

There are three fundamental principles in rate making, namley, the cost of the service, the value of the service to the customer and avoidance of discrimination. The great difficulty seems to lie in reconciling these three principles in their application in any given case. We have, first, the difficulty of finding the true costs, and second, we have the divergence of opinion and lack of experience as to what the service is reasonably worth. Rate regulating bodies will be very alert to discover and prevent discrimination.

Cost of Service

There are three elements in the cost of service that have come to receive quite general recognition. There are, first, the costs that are designated ',customer costs" because they are proportionate to the number of customers and are, therefore, essentially alike for each customer. It is the number of customers that to a large degree determines the physical extent of the utility's property, especially of the distribution system. Customers, as such, require that extensions be made for them, and they are made without placing upon the customer the obligation to use a certain quantity of gas. Customers require an individual service pipe to supply them; a meter must be placed to measure their individual use of gas, no matter how great or small that use. There are expenses such as accounting, collecting, reading of meters, maintenance of meters and service pipes, etc., that must be averaged for the consumers as a whole. The Kansas Commission has used the following definition of "customer costs": "The 'customer charge' consists of the expense of bookkeeping, billing, collecting, setting, removing and repairing meters, gratuitous complaint service, office rents, meter reading and other expenses, and a part of the fixed charges of the physical property. The aggregate of these various customer expenses will be identical for all customers regardless of whether they use gas in small or large amounts, or no gas at all. The "customer charge' has often been incorrectly referred to as the expense of reading the meter, but this is only one minor item."

Demand Cost

"The demand cost" is perhaps not so easily recognized as being something apart from the volume of gas used. The plant of the company, both for the production of gas and for its distribution to customers, is subject to the demands made upon it which vary hourly, daily, and seasonally, and the capacity that must be provided is that which shall be equal to the maximum composite demand of all customers. The distribution capacity must be that of the maximum demand momentarily exercised by all customers. Gas as produced is stored in holders, and production goes on, as nearly as may be, uniformly throughout the twenty-four hours, and so it may be said that manufacturing capacity, together with storage, must be ample to meet the maximum twenty-four hour use. If the function of plant is to meet the demands that customers make upon it, it is obvious that the costs of providing and maintaining it are related to the demands made by customers and not to the quantity used in a month or a year. Such costs are: interest and depreciation.

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*Delivered at the Thursday Meeting of the General Session, A. G. A. Convention, Atlantic City, Oct. 15, 1925.

taxes on the production plant and distribution system, as well as certain operating expenses. The Kansas Commission has adopted this definition for the "demand charge": "A 'demand charge' consists of that part of company expense incidental to providing and maintaining the production, transmission and distribution system of sufficient capacity to render service as required. The principal elements in this cost are the fixed charges, among which are interest, taxes and depreciation on the necessary plant, and part of the operating and maintenance expense of the physical property. The 'demand charge' is distributed among the customers in proportion to the demand which is contracted for by each customer, and hence in the proportion which each customer contributes towards the creating of the total demand expense."

Commodity Cost

The "commodity cost" consists of the items of material and labor, and expenses and repairs directly entering into the production of gas, and which are directly proportionate to the volume produced.

To determine what the costs under the three heads of "customer", "demand" and "commodity" are, necessitates the analysis of all expenses or charges so that they can be correctly allocated under these three different headings. This is not so difficult to do for the trained analyst. The difficulty arises when you come to incorporate the three different elements of cost into a schedule of rates and to fix the rate of demand of consumers, and it results in increasing the cost, as compared with present prices, to a large number of customers.

Value of Service

Here enters the question as to what the service is worth. The service to those who, under application of the three part rate, would have their bills increased might be indispensable, and so would be said to be worth all that it costs to furnish. However, regulating bodies will be very careful to determine whether such increase would be a real burden to those who can ill afford to bear it, and should they see in such increase a real burden they will scrutinize very critically the methods of arriving at the customer and demand charges and search for the slightest evidence of discrimination. If the small customer, meaning by that, one using a small quantity of gas per month, were in effect discriminated against in favor of the larger customer, such a rate would be found indefensible. It will never be possible for every individual customer to be dealt with upon the basis of all the facts in his particular case, but as to groups and classifications there should be no discrimination. If the smaller customer may not be discriminated against in favor of the larger, neither should the larger customer be discriminated against in favor of the smaller, as he is under the present rate structure. At the present time the large customer is bearing a large share of the cost of the smaller customer, and that not because the smaller customer cannot bear it, or that it will be a burden to ask the smaller customer to pay his full cost.

Who Are the Small Customers?

There is still a widespread impression that the small customer, the one using a small quantity of gas per month, is the poor man, the laboring man—or at any rate the impression exists that the small customer is the one who keeps his bills down to the necessities of his purse. As a matter of fact, it has been demonstrated by investigation, the laboring man and woman are not the small customers, but have bills that are very near the average. It is not the man or woman that must keep down the gas consumption because of the cost, that is the small customer, but the one who has little use for gas, and whose circumstances and type of residence are such that he cannot use larger quantities of gas. No doubt there will be occasional poor people in the class of very small customers, but as a class the "small customers" are not identical with our poor people. Why, then, should it be spoken of as a burden when it is proposed to place the costs upon these small customers?

"Demand" Element and Domestic Customers

How is it now with the "demand" element of costs, and in connection therewith—the "diversity" of demand among our domestic customers? In speaking of the "demand" feature we are thinking of the uses that constitute the bulk of our sales, namely, domestic cooking, domestic lighting, and domestic waterheating, and leaving out of consideration for the time being the incidental use for space heating. The "demand" phase of serving these uses is not wholly bad. For while we have large numbers of domestic customers with a 5 per cent individual load factor of distribution the diversity among customers is such as to produce a load factor for the distribution plant as a whole of 25 per cent to 30 per cent, and while load factor of the twenty-four hour demand of domestic customers varies from 50 per cent to 75 per cent, the diversity of manufacturing demand produces for the plant, as a whole, a load factor of 85 per cent. But, however great this diversity among domestic customers is ordinarily, on certain days it disappears to a large extent, as on Thanksgiving Day when the cooking of dinners coincides to a much greater extent than it does on other days. It is on that day when, notwithstanding the entire industrial load is off the plant, that by far the heaviest demand is made upon the distribution capacity. Thus the domestic customers create our maximum hourly demand on days when there is no industrial demand, yet on other days the diversity of use among domestic customers is such that though the industrial uses are added to the load, the maximum hourly rate is not nearly as great. Of course, these phases of demand are not referred to as being universal. Demand and diversity factors are peculiar to each locality and must be studied as such.

Rates for House Heating

Theodore V. Purcell

Chicago, Ill.

CHICAGO'S rate for gas to ordinary customers averages 99 cents a thousand cubic feet; gas for house heating, however, is sold through separate meters on a special rate and averages 76 cents a thousand. In view of the well-known fact that house heating requires a very much larger investment in manufacturing equipment than that required by the ordinary domestic load, the question arises, how can the Chicago company afford to sell house heating gas 23 cents cheaper than the gas sold to ordinary customers?

It would be difficult to justify this house heating rate by a theoretical discussion of the relative costs of the two classes of service. If we follow the usual procedure of constructing a rate from a correct allocation of costs, but without previously apportioning the charges between the two classes of business, it will be difficult to show that house heating gas can be sold at any price less than that now applied to the domestic load, but have we not reached the point where this question should be considered in the light of actual conditions rather than theories?

The Problem

The problem is not a comparison of the cost of the present composite load with a load of equal volume consisting exclusively of house heating; it is rather a comparison of the cost of the present load with a combination of the present load and the new house heating load.

In the consideration of this, it is not necessary to assume an independent system of manufacturing and distributing equipment for the house heating load. We may take it for granted that a great deal of the present equipment will be available for this new business, and that, for the present, at least, it is only necessary to charge into the price for house heating the additional equipment that must be provided.

Calculations

If we set up two four-part allocations, one for the present load and one for the house heating load, we shall find that there is very little difference in the cost per 100 cubic feet of manufacturing or 24-hour demand. The cost for the present load is $3.60 per 100 cubic feet of demand and for the heating load $3.10.

The distribution costs per 100 cubic feet of the maximum hourly demand are for the present load $23.30 and for the heating load $8.90. This decrease is because the capacity can be doubled with an additional investment of only 21 per cent, and follows an apportionment of the charges between the two classes based on actual conditions.

The customer charge is $11.50 for the present load and $3.60 for the heating load. This difference in favor of the house heating customer is also the result of a reassignment of the charges.

First, the fixed charges and maintenance of the 6-inch main system are assigned to the present load and not to the house heating load.

Second, the fixed charges and maintenance of service are assigned to present load and not to the house heating load.

Third, the fixed charges and maintenance of meters is very much reduced because there are only 60,000 house heating meters compared with a total of over 800,000 meters.

Fourth, it is assumed that a single rate can be constructed that will be applicable to both domestic and house heating consumption, under which the customer would pay approximately 99 cents for his cooking gas and 76 cents for heating gas. On this assumption only one meter would be used. Meter reading, bookkeeping, billing and other commercial expenses are, therefore, assigned to the present load and not house heating.

Commodity Charge

The commodity charge for the present load is 45 cents per thousand cubic feet. We have assumed a commodity charge of 40 cents per thousand for house heating load. This load will be taken care of by modern equipment in large units. A comparison of costs of production with new and old equipment shows that this estimate of saving is very conservative.

With these allocations before us we can now calculate the cost of serving the typical domestic customer and the typical house heating customer.

The domestic customer using 36,000 cubic feet per year should pay

14 cents per M for manufacturing demand.
15 cents per M for distribution demand.
32 cents per M for customer charge.
45 cents per M for commodity, making a total charge of

$1.01

The house heating customer using 500,000 cubic feet per year should pay

32 cents per M for manufacturing demand.
04 cents per M for distribution demand.
01 cent per M for customer charge.
40 cents per M for commodity, making a total charge of

77c

These charges per M are approximately the rates

now effective in Chicago, indicating that under these rates we can take on house heating business to the very large amount of 30 billion cubic feet per year, building the necessary manufacturing plant and reinforcing the distribution system without fear of reduced return on the investment.

The Principle

This whole argument depends, of course, on the propriety of fixing a price for new business, based on the additional cost of the additional business.

The principle involved hardly needs to be defended. It has been an established practice of railroads and electric companies for years. When properly dealt with it imposes no unfair burden on the original group of customers and must eventually result in lower rates for them. Over a period of time when the ratio of new business to old business has increased greatly, it will be necessary to make a new assignment of charges as between the two classes, but we are a long way now from any such necessity.

Our sales are now dominated by the domestic load and until they are dominated by house heating it sems fair to apportion many of the charges exclusively to the domestic business.

House heating opens up a wonderful future for the gas business. We can look forward to constantly increasing sales eventually reaching enormous volumes. Even the most conservative must feel sure that with this great expansion must come improved methods and cheaper production.

Therefore, we should not permit any doubts arising out of a too precise and theoretical consideration of this matter to prevent our going after this business with enthusiasm.

(This report will be found in full in the Proceedings of American Gas Association.)

Problems Confronting the Chemist in the Gas Industry*

A discussion of important chemical problems

A. F. Kunberger

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SCIENCE and technology have the function to adapt matter to the requirements of society and this is accomplished by production.

It is quite indifferent which phase of production we consider, a scientific problem, mechanical action or chemical reactions, agriculture or mining, a singular action of the muscles of a living creature or the complicated functions of the large industrial enterprises. The fundamental factor is motion adapted to a preconceived idea or will.

We may express this in a more specific form, thus: the human effort, in imitating or reproducing natural occurrences, spends itself in rearranging existing conditions.

It seems, at first glance, somewhat vague to attribute to transporting or motion all occurrences and all accomplishments in art and science, but on closer observation we realize that, after all, even a thought is the effect of motion. In the growth of a tree we have the same accumulation of matter, due to motion, as we have in the piling up of rock or its equivalent in a large building, only man has succeeded in doing it faster. The same is true of other changes, while insects such as the fire fly may produce light at less expense and nature may or may not have produced gas and oil with 100 per cent efficiency through decomposition of organic matter, with subsequent polymerization by heat or pressure or both, and in all probability by the aid of catalyzers. One fact is certain, it required unlimited space and time.

Motion of Particles

In the processes themselves both chemical and mechanical or physical, if such a distinction can be made, we have the continuous motion of particles by rearrangement of the ratio and position of the element hydrogen to that of carbon, oxygen or nitrogen, from the ions to the more complex addition products or chemical compounds. This is equally true whether nature is the prime mover or man; and the final product is energy, either stored in the form of gas or oil or liberated in form of power.

We know, that when coal is heated in the retort, the complex chemical compounds or substances which constitute the black mass are changed,—rearrangement takes place. First dissociation of what is generally termed volatile matter and which consists, in a large part, of hydrocarbons takes place. However, this volatile or oil substance is subject to continuous changes after its dissociaiton. Hydrogen is split off and reunited in other forms of hydrocarbons until it finally issues from the retort as, what we term, commercial gas.

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*Read at the Thursday meeting of the Technical Section, A. G. A. Convention, Atlantic City, Oct. 15, 1925.

Coal Derived from Vegetable Matter

We know that nature changed (carbonized) vegetable matter into coal, formed gas and liquid fuel without heat or at least without sensible heat of any high degree, but with unlimited space and time.

No doubt, germ life instead of heat, played an important factor in furnishing the energy in some of the reactions. To produce the same products, from the same raw materials or matter, in a space and time suitable for practical purposes, we have to sacrifice matter to furnish the energy.

Work is the sum of all energy expended and according to the law of compensation efficiency of any production method is limited by these factors.

I am not saying this to absolve the chemist in the gas industry from the reproach that he has accomplished little in improving methods to produce gas, but to show that such improvements are limited by the functioning of certain laws.

Gas Improvements Mostly Mechanical

Most improvements in gas making have originated in the engineering department and are of mechani-

A. F. Kunberger

cal rather than chemical nature, and yet present day developments in the field of coal research and that of gaseous products from the coal are indicating that, if any fundamental improvement is to be accomplished, we have to make use of these developments.

Heretofore, the most active incentive to search for improving methods, competition, was not serious, as a matter of fact, there are a good many who feel that electric competition, for example, had spent itself when it removed from our pockets most of the revenue originally derived from the lighting and power business.

I am one of those who feel that safety lies in preparedness. Even to those companies operating combined properties, it is of vital importance that their gas property should not only remain a revenue producer and not become a liability to the electric unit, but also should grow.

Sanitary Problem

In the manufacture and distribution of gas, aside from the economic factor, sanitary conditions have to be considered. We may successfully remove certain impurities, which either existing statute demands or our own safety requires to remove, such as ammonia, sulphur-compounds, cyanogen, and tar as well as the oils. In removing these impurities we have to dispose of waste products.

In the earlier days all of these were transported to the nearest river or creek by the shortest route. Objections were raised and both tar and ammonia were recovered. However, the fact that a revenue could be derived from these "foul and evil smelling" substances, rather than any desire to eliminate the nuisance, were responsible for the rapid development of recovery plants.

The waste liquor from the ammonia recovery still, along with other waste water containing tarry substances, are in most places, still discarded into streams without any effort to remove the objectionable ingredients.

Removal of Tarry Matter from Waste Water

It is true that a number of works or their chemists are working on the subject and some have installed more or less successful plants to remove the objectionable phenols or tar acids from the waste liquor. A plant to remove the tarry matter from the waste water of a water gas plant has been in operation for several years in one of our plants, and although I designed the plant, I admit that, notwithstanding the fact that it does the work, I would be glad if an easier way could be found to do it.

The plant consists of a large (5,000 gal.) tank in which the waste water is treated with a small quantity of iron sulphate to help precipitate the suspended organic matter. It then passes through another tank of the same size in which baffles are so arranged that both light oily matter may be skimmed off at the top, if necessary, and the heavy precipitate consisting of iron hydrate and tarry matter may be drawn off from the bottom.

From this tank the water flows alternately to either one of the two sand filters placed below the tanks, and is collected in a third tank placed in the ground. From this tank it can be discharged directly into the river or pumped back into the works as need may be.

Total Gasification

After all, the foregoing are minor problems and do not seriously influence the future development of the industry. Of vastly greater importance is the actual production of gas from coal or rather the total gasification of coal.

Strictly speaking, we have always totally car-

bonized coal but usually in two steps. In the first, we made coal gas and later used the coke in our water gas apparatus. However, very few, if any, actually balanced this operation and most plants did only one of the two operations. They either sold the coke produced or bought the coke required.

The nearest approach to total carbonization, other than the first mentioned combination coal and water gas plant operation, is the use of soft coal in the water gas generator. It has, however, as a primary motive, the object to replace the more expensive coke by the cheaper coal. From an economic viewpoint this is not fully efficient, for a great deal of the rich coal gas and most—if not all—of the by-products are lost. However, it reduces the holder cost of the gas by the difference in the prices of coal and coke minus the losses in volatile matter during blasting. While this is not all lost, nevertheless, where a waste heat boiler is in operation, we are using a practically rich gas for fuel, where producer gas would be just as efficient.

Many Patents Issued

A large number of patents have been taken out for total carbonization schemes. They are fundamentally the same, but differ in application of the principle. Some of them use a double generator set. Both generators are started with a hot coke fire, then blue gas is made in one and soft coal charged into the other. The blue gas from the first is passed through the second and the sensible heat of the blue gas is supposed to carbonize the soft coal in the other. After the coke in the first has been reduced to a point where it is no longer economical to produce blue gas, the second generator, by now filled with what is supposed to be coke, is used for making blue gas and the first is charged with soft coal. Although theoretically attractive, there are, however, practical difficulties to be anticipated due, for example, to the low conductivity of coal and the short time of contact. It is true that several of these inventors help themselves with the heat accumulated from the blast, but since 350 B.t.u. gas is the best they may expect with such an arrangement, this heat will be needed, the same as it is now, for gasifying the oil for enriching the lean gas.

Low Temperature Carbonization

If we study the work of Fischer and others, we wonder why no serious effort has been made to adopt some of the reactions involved to the water gas production.

Before going into detail regarding the probabilities of such a method, I would like to dwell for a brief time on the subject of low temperature carbonization, as it forms a possible link in the scheme of total carbonization.

The greatest drawback to this quite recently developed method of carbonization is the quality of coke and the life of the apparatus. However, late developments indicate that both may be neglected, as an apparatus has been developed that is supposed to give a very hard coke and the modern construction is expected to assure a reasonably long life for the apparatus. The advantages, at least from our viewpoint, are the small area required for a retort carbonizing 50 to 100 tons of coal a day, the low installation cost, and the high claimed efficiency of the apparatus.

Character of Present Day Carbonizing

The present-day methods of carbonizing require high temperature to heat through the comparatively thick body of coal. These temperatures are all out of proportion to the actual requirements, but since coal is an extremely poor conductor of heat, it is necessary to heat the walls of the retorts to these temperatures, and for a period of time, corresponding to the thickness of the coal body. To utilize the heat for steam making does not materially reduce the loss since only a small amount can be recovered. If the figures given by the European authors are reliable (and I have no reason to doubt them) there should be some points of interest in this method.

In the foregoing we have seen two ways for improvement, in the one we have total gasification under favorable efficiency conditions, but resulting in a low B.t.u. gas, which has to be enriched with oil. In the second, partial gasification with very high efficiency, but we obtain by-products which have to be disposed of. With a good domestic coke market the second scheme, no doubt, is the most attractive one, even though we should have to use the tar for gas making.

However, we have to carry on two different types of business, the gas business in which we are primarily interested and the coke and by-product selling business which, very often, is a handicap.

This brings us back to the first scheme, which is equally as efficient but due to total gasification of the coal, increases the blue gas ratio to that of the low temperature gas, to the extent of lowering the heating value of the gas, to approximately 360 B.t.u.

If we can increase this, without the use of oil, we have accomplished total gasification, and it is with this end in view that I will deal with the work of Fischer and his associates, as well as others.

Synthetic Hydrocarbons

It is needless to say that such pressures, as used by Fischer to produce from blue water gas, alcohol, fatty acids and oils, are out of the question in the gas operation. However, we are not interested in the production of compounds with large molecules We are interested in CH_4, C_2H_2, C_2H_4 and C_2H_6.

It is not necessary that we change all of our hydrogen to these compounds, as long as we change enough to form sufficient of them to bring the heating value up to 525. Approximately 20 per cent of methane will do this, or less than 20 per cent of any appreciable amounts of C_2H_2, C_2H_4 or C_2H_6 are formed.

All of these can be produced from blue water gas, at comparatively low pressures, in the presence of hydrogen fixing metals or catalyzers.

This report will be found in full in the Proceedings of the American Gas Association.

Rates for Industrial Gas*

Gas must be able to compete with other fuels

Theodore V. Purcell

The Peoples Gas Light & Coke Co., Chicago, Ill.

IT is generally agreed that there is a large field for the use of gas for industrial heating. The development of this field has been progressing steadily and with gratifying results, but there is no escaping the conclusion that unless we offer rates that are really competitive the industry will continue to be deprived of huge blocks of business that belong to it by every economic right.

Extended investigation shows that a majority of users of gas for industrial heating would largely increase their consumption under rates that would compete with the cost of oil and coal, and that many additional industries not now presumed to be prospective business could also be brought in.

Experience has also disclosed that, in order to justify the use of gas for many industrial purposes, it is not necessary that the first direct cost of gas be brought as low as the comparable cost of other fuels. The use of gas has many collateral advantages. It is cleaner to handle. It makes possible better working conditions. It conserves labor. It gives a better control of heat. The service is instantaneous. The pressure is constant. The quality is uniform. These operating advantages enable a manufacturer to turn out not only a better finished product, but also a cheaper product, the higher cost for heat being offset by the other advantages enumerated above.

Rate Structure Should Be Based on Load Characteristics

A study of this subject makes apparent the necessity of analyzing our business to determine into what classes it may properly be divided. In most situations it will be found that the total load is made up of several distinct classes each with its own peculiar load characteristics, as for example, cooking, house heating, and industrial. It is obvious that the cost of the plant required for equal volumes of sales in these classes will differ widely and it follows that a rate constructed from a single allocation of costs cannot justly be applied to any of them.

Competitive Feature Must Be Considered

When we confine our attention to the industrial load we find that apart from its load characteristics it has a feature that must be taken into consideration if we are to deal intelligently with the question of rates for this business.

This feature, also peculiar to house-heating, is the highly competitive character of the business of selling gas for factory purposes. The manufacturer is not compelled to buy his fuel from the gas company. He will purchase other fuels unless the price of gas, taking into account all the collateral advantages, enables him to make his product cheaper.

This competitive feature separates industrial gas sales from the regular business of the public utility company, that of supplying domestic customers, and justifies an entirely different foundation for a rate structure.

Influence of Load on Plant and Other Investment

Having analyzed sales into classes with respect to load factor, diversity, and other features and noted carefully these characteristics, the next step is to consider how and to what extent the investment in plant and equipment has been influenced by the varied requirements of these classes.

This point may be illustrated by the results of a study of a rate for house-heating by a company whose load was 80 per cent domestic. It was found that a manufacturing plant two and one-half times as great as the present plant would be required to supply house-heating customers whose aggregate consumption would be equal in volume to the present load. But with respect to the distribution system the conditon was quite different. The investigation showed that the distribution system could handle an additional 100 per cent of gas, provided it was house-heating gas, with an additional investment of only 21 per cent. Here was a large investment imperatively required to supply domestic customers that could with a very small additional cost be made adequate for the needs of another class of business of equal volume.

Investment Must First Be Assigned as to Class of Business

A consideration of this point makes it clear that before allocating costs for rate making, it is necessary to analyze the investment and assign it in proper proportions to each class of business. When this is done, a separate allocation can be made for each class and from these separate allocations fair and adequate rates can be constructed for each class.

Distinction Between Non-Competitive and Competitive Business

To be fair these rates must be built on the principle that all customers, domestic and industrial, should pay the full cost of the actual production of the gas used by them, including fixed charges on the gas plants and holders utilized, but it is evident that in some of the items of cost a distinction should be observed between domestic customers who can demand service and who therefore require the maintenance of sufficient plant and equipment to meet their largest peak load, and other customers who will purchase gas only on a competitive basis

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*Presented at Thursday Meeting of General Session, A. G. A. Convention, Oct. 15, 1925.

and who can be taken on with an additional investment in plant proportionately very much less than the amount imperatively needed and already in use by the domestic load.

Domestic Class Requires Exclusive Use of Whole Distribution System During Peak Hour

The problem may be stated as follows: A certain investment in plant and equipment is actually needed to carry on the principal function of the public utility, that is supplying gas to a large number of domestic customers. This equipment is necessarily large in relation to its actual total use on account of the peak demands of these customers resulting in a part of the capacity remaining idle except for the comparatively short peak period. Now by utilizing this idle capacity and adding a relatively small amount of new capacity, a large volume of business of diverse character can be taken on. The question then is: Shall the new business be charged for its pro-rata share of the total plant and equipment or only for the additional capacity required?

Idle Off Peak Capacity Should Be Utilized

Before attempting to answer the question it might be well to set up the principle that should govern; that the utility should endeavor to take on additional competitive business at the highest price that will compete with other fuels provided that the ultimate effect of taking on this business will be to improve the service or lower the price to the regular customers of the utility.

Income from Competitive Business Must Be in Excess of Operating Costs and Fixed Charges on Additional Investment Required

It is obvious that the new business cannot tend to lower the price to regular customers unless it pays full operating costs and a share of the capital charges that will more than fully cover all the additional investment required.

Therefore, when we proceed to assign the investment to the several classes of sales the highly competitive nature of the industrial business must be recognized. These are not customers who demand gas service. They can and do use other fuels with equal willingness and can be induced to use gas only by correct pricing and good salesmanship. If they can be so induced without increasing the burden now borne by small customers, the industry will prosper, profits will increase and the small customer will ultimately benefit. If not, the small customer must continue permanently to carry all charges.

As to the above described industrial customers, it is believed that only the additional investment actually made to take on the business should be assigned to this class.

A NEW INDUSTRIAL RATE

Business Analyzed Into Classes

In the study recently made for a new rate for The Peoples Gas Light and Coke Company the sales were analyzed into classes and particular attention was given to the load factors, diversity, and other features of the domestic and industrial loads. It was observed:

First—That the production load factors of the two loads were about equal.

Second—That the distribution load factor of the industrial load was higher than that of the domestic load.

Third—That there was a considerable diversity between the two loads.

Fourth—That the industrial business was competitive.

Factors Considered Before Assigning Investment

Before considering the effect of the diversity between the two classes and having in mind only the load factors, it would seem that the investment should be assigned on a pro-rata basis, but, as will be shown later, the diversity in this case is of such a character that taking into consideration the fact that the business is competitive it is proper to assign only a small part of the distribution investment to the industrial class.

Manufacturing Fixed Charges

Proceeding to a consideration of the cost items entering into a rate for industrial gas the first item of cost is that of the fixed capital charges incurred in owning and holding ready the necessary plant for the production of gas.

For the situation under consideration the present cost of constructing the generators, boilers, holder, and other equipment for producing carburetted water gas is approximately $250,000 per 1,000,000 cubic feet of capacity per twenty-four hours.

The capital and other fixed charges on such investment amount to approximately 12 per cent per annum, or $30,000. This 12 per cent includes 7.5 per cent return to the company for the use of the property, 1.75 per cent for taxes, and 2.75 per cent for retirement expense and insurance.

A plant serving industrial customers would be used approximately 300 days out of each year, and so would produce for each 1,000,000 cubic feet of capacity 300,000,000 cubic feet of gas. The annual fixed charges against such a plant of $30,000 for each 1,000,000 cubic feet of daily capacity accordingly would amount to $.10 per 1,000 cubic feet of gas produced.

Distribution Fixed Charges

The next item of cost is that of the fixed charges on the investment in distribution plant and equipment.

By reason of the popular habit of celebrating certain holidays, it is necessary for gas companies to maintain a distribution system sufficient to meet

hourly peak loads which occur but once or twice a year.

All of the Distribution Equipment Necessitated by Domestic Peak

It is the experience of this company that the highest hour of the year usually falls on Thanksgiving Day, from 12 noon to 1 P. M. In 1924 the sendout of gas in Chicago during that hour was 12,384,000 cubic feet, the highest in the company's history. The importance of this from the standpoint of industrial gas sales is that the equipment imperatively required for this peak load is to a certain extent unused throughout the rest of the year. Excluding Sundays (days on which industrial gas sales would be slight) the next highest hour the company has ever had was from 5 to 6 P. M. on October 16, 1924, when the sendout rose to 9,782,000 cubic feet. This shows a standing available and unused distribution capacity of at least 2,602,000 cubic feet per hour which the domestic customers nevertheless require because of their occasional sharp demands. It is apparent, then, that if the demand made by additional industrial gas business upon existing distribution facilities did not exceed 2,602,000 cubic feet between the hours of 5 and 6 P. M. on week days it would impose no added burden upon such facilities. In fact the demand would be substantially less than that for a long time, probably years, to come.

Idle Off Peak Capacity Can Be Utilized by Industrial Class

An examination of the average load curve of a number of typical industrial customers now connected shows that with approximately 10,000,000 cubic feet of gas per day now sold for industrial purposes, the amount taken between 5 and 6 P. M. is less than 400,000 cubic feet, or less than 1/6 of the idle distribution equipment available at that hour. Industrial gas sales could attain the height of over 20,000,000,000 cubic feet per year, or approximately 2/3 of present sales for all purposes, before they would bring the total load on distribution equipment at the peak hour up to an amount equal to that now placed on it by domestic customers on occasional Sundays and holidays. Up to such a point the industrial gas load would, therefore, impose no additional burden.

Under these conditions it is proper to include no specific item to cover fixed charges upon distribution equipment. The equipment is there anyway and is idle a great part of the time. The domestic customers require it to be there to meet their occasional large demands, and they are carrying its fixed charges and must continue to carry them if this business is not taken on.

Additional Investment Required Assigned to Industrial Class

While no specific allowance is made for distribution equipment generally, it is known that certain out-of-pocket expense will actually occur for new meters, service pipes, connections, and in some cases additional short sections of main.

An examination of the situation of a number of typical industrial customers now connected, but whose demand for gas could be expected to increase largely with more favorable rates, showed a necessary additional capital expenditure at the rate of approximately $33 for each additional 1,000,000 cubic feet of sales. Taking 12 per cent as covering the annual fixed charges on this investment, in the form of taxes, retirement expense, maintenance and return, such charges would amount to $3.90 per annum for each 1,000,000 cubic feet sold, or $.0039 per 1,000 feet.

Operating Expense

The next item of cost is that of operating expense. During 1924 the actual cost to the company of producing water gas at its newest plant was $.343 per 1,000 cubic feet, made up as follows:

Holder Cost of Gas Produced

	Per 1,000 Cubic Feet
Steam	$.011
Water for Steam	.002
Generator Fuel	.156
Water Gas Oil	.133
Purification Supplies	.004
Miscellaneous Works Expense	.004
Labor	.021
Plant and Equipment Maintenance and Repairs	.017
Superintendence	.007
Engineering Department General Charges	.004
Total	$.359
Credit Residuals Produced	.016
Net Cost of Gas Produced	$.343

It is assumed that on any increase in production the costs would be as low if not lower than these costs.

It is not considered that any substantial increase in this cost will occur in the immediate future, with the exception of a possible increase in the cost of fuel oil, which should be covered in the proposed rate by a special clause.

Pumping

From the holder the gas must be pumped out under five pounds pressure per square inch, following the company's standard method. The cost of pumping in 1924 was $.0193 per 1,000 cubic feet for all gas sent out. Eliminating certain fixed expenses not dependent on the quantity of gas pumped, the actual additional cost incurred for each additional 1,000 cubic feet of gas pumped was $.0127, and this figure would, therefore, be taken to cover pumping cost.